Vol. 1118 Number 4

OFFICIAL GAZETTE

of the

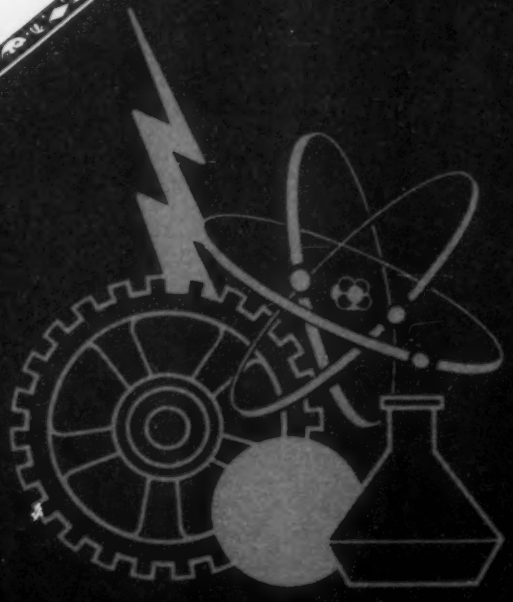
UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

PATENTS

September 25, 1990



U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

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GENERAL INFORMATION concerning TRADEMARKS.

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Printing authorized by Section 11(a)3 of Title 35, U.S. P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1118 O.G. 14 on Sept. 11, 1990.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988. There is no longer a limit on the number of such international applications accepted for international preliminary examination by the European Patent Office; see the notice appearing at 1116 O.G. 32, on July 17, 1990.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on September 1, 1990 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1116 O.G. 32 on July 17, 1990.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees (in U.S. dollars) is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA)	
—No corresponding prior U.S. national application filed	550.00
—Corresponding prior U.S. national application filed	380.00
—Supplemental search fee, per additional invention	150.00
European Patent Office as ISA	1242.00
Preliminary examination fee	
USPTO as International Preliminary Examining Authority (IPEA)	
—Search fee paid to USPTO as ISA.	400.00
—Additional examination fee, per additional invention	130.00
—ISA not the USPTO	600.00
—Additional examination fee, per additional invention	200.00
International fees	
Basic fee	502.00
Basic Supplemental fee (for each page over 30)	10.00
Designation fee per country or region for the first 10 national or regional offices	122.00
Designation fee for 11th and subsequent designations	No Charge
Handling fee	154.00

U.S. National Stage fees

	Small Entity	Regular
USPTO was IPEA	165.00	330.00
USPTO was ISA but not IPEA	185.00	370.00
USPTO was neither ISA nor IPEA	250.00	500.00
USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4)	25.00	50.00
—For each independent claim in excess of 3	18.00	36.00
—For each claim in excess of 20	6.00	12.00
—For each application containing a multiple dependent claim	60.00	120.00
—Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT Article 22 or 39(1)	60.00	120.00
—Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1)	30.00	30.00

Aug. 16, 1990

HARRY F. MANBECK, Jr.
Assistant Secretary and Commissioner of Patents and Trademarks.

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on September 22, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,694,505 through 4,696,063
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on September 20, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,404,687 through 4,406,020
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED JULY 15, 1990
DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
Re. 32,832	07/037,903	1/17/89
(4,600,115)	(06/667,192)	(7/15/86)
4,338,725	06/222,991	7/13/82
4,338,729	06/261,784	7/13/82
4,338,736	06/278,509	7/13/82
4,338,744	06/243,841	7/13/86
4,338,761	06/224,639	7/13/82
4,338,769	06/245,752	7/13/82
4,338,907	06/297,382	7/13/82
4,338,918	06/222,447	7/13/82
4,338,943	06/236,068	7/13/82
4,338,953	06/220,253	7/13/82
4,338,958	06/228,521	7/13/82
4,338,988	06/240,208	7/13/82
4,339,036	06/217,903	7/13/82
4,339,096	06/223,222	7/13/82
4,339,107	06/293,685	7/13/82
4,339,121	06/240,218	7/13/82
4,339,136	06/223,276	7/13/82
4,339,180	06/252,426	7/13/82
4,339,192	06/286,190	7/13/82
4,339,197	06/246,168	7/13/82
4,339,251	06/318,635	7/13/82
4,339,273	06/234,912	7/13/82
4,339,309	06/260,622	7/13/82
4,339,327	06/256,898	7/13/82
4,339,336	06/246,513	7/13/82
4,339,341	06/280,271	7/13/82
4,339,342	06/250,683	7/13/82
4,339,344	06/267,047	7/13/82
4,339,369	06/256,747	7/13/82
4,339,441	06/316,926	7/13/82
4,339,447	06/228,792	7/13/82
4,339,450	06/219,213	7/13/82
4,339,452	06/218,284	7/13/82
4,339,467	06/277,130	7/13/82
4,339,477	06/244,363	7/13/82
4,339,502	06/220,217	7/13/82
4,339,511	06/254,710	7/13/82
4,339,526	06/276,850	7/13/82
4,339,576	06/295,759	7/13/82
4,339,582	06/293,965	7/13/82
4,339,590	06/226,834	7/13/82
4,339,591	06/246,313	7/13/82
4,339,597	06/240,966	7/13/82
4,339,630	06/271,203	7/13/82
4,339,635	06/219,716	7/13/82
4,339,700	06/236,483	7/13/82
4,339,705	06/242,784	7/13/82
4,339,736	06/271,739	7/13/82
4,339,738	06/259,241	7/13/82
4,339,740	06/271,247	7/13/82
4,339,742	06/270,561	7/13/82
4,599,747	06/648,748	7/15/86
4,599,751	06/652,015	7/15/86
4,599,752	06/623,235	7/15/86
4,599,753	06/764,487	7/15/86
4,599,754	06/658,635	7/15/86
4,599,756	06/731,456	7/15/86
4,599,757	06/699,802	7/15/86
4,599,758	06/683,626	7/15/86
4,559,759	06/615,918	7/15/86
4,599,761	06/689,066	7/15/86
4,599,764	06/637,481	7/15/86
4,599,765	06/527,182	7/15/86
4,599,769	06/709,996	7/15/86
4,599,774	06/772,156	7/15/86
4,599,779	06/537,801	7/15/86
4,599,780	06/524,939	7/15/86
4,599,782	06/667,375	7/15/86
4,599,785	06/682,425	7/15/86
4,599,794	06/664,498	7/15/86
4,599,797	06/660,408	7/15/86
4,599,798	06/752,029	7/15/86
4,599,799	06/639,234	7/15/86
4,599,805	06/673,717	7/15/86
4,599,806	06/697,139	7/15/86
4,599,815	06/646,691	7/15/86
4,599,819	06/791,794	7/15/86
4,599,825	06/765,584	7/15/86
4,599,827	06/747,741	7/15/86
4,599,831	06/685,740	7/15/86
4,599,839	06/445,279	7/15/86
4,599,840	06/642,679	7/15/86
4,599,843	06/541,339	7/15/86
4,599,849	06/624,744	7/15/86

Patent Number	Serial Number	Issue Date
4,599,864	06/691,699	7/15/86
4,599,869	06/588,616	7/15/86
4,599,875	06/639,011	7/15/86
4,599,886	06/659,305	7/15/86
4,599,888	06/558,979	7/15/86
4,599,897	06/718,033	7/15/86
4,599,907	06/725,136	7/15/86
4,599,910	06/426,875	7/15/86
4,599,913	06/580,206	7/15/86
4,599,914	06/513,467	7/15/86
4,599,922	06/600,835	7/15/86
4,599,934	06/631,987	7/15/86
4,599,937	06/699,866	7/15/86
4,599,939	06/687,755	7/15/86
4,599,953	06/752,773	7/15/86
4,599,958	06/712,154	7/15/86
4,599,963	06/647,417	7/15/86
4,599,964	06/685,243	7/15/86
4,599,974	06/640,977	7/15/86
4,599,975	06/646,016	7/15/86
4,599,981	06/671,321	7/15/86
4,599,983	06/424,751	7/15/86
4,599,984	06/516,557	7/15/86
4,599,986	06/642,397	7/15/86
4,599,990	06/763,501	7/15/86
4,599,992	06/771,126	7/15/86
4,599,993	06/656,940	7/15/86
4,599,995	06/668,992	7/15/86
4,599,996	06/671,480	7/15/86
4,599,997	06/534,337	7/15/86
4,600,003	06/415,804	7/15/86
4,600,004	06/415,805	7/15/86
4,600,005	06/643,666	7/15/86
4,600,007	06/640,309	7/15/86
4,600,022	06/700,481	7/15/86
4,600,023	06/611,755	7/15/86
4,600,025	06/492,256	7/15/86
4,600,030	06/622,879	7/15/86
4,600,034	06/641,327	7/15/86
4,600,042	06/650,239	7/15/86
4,600,054	06/595,552	7/15/86
4,600,055	06/747,582	7/15/86
4,600,056	06/698,130	7/15/86
4,600,081	06/723,541	7/15/86
4,600,082	06/753,062	7/15/76
4,600,084	06/669,360	7/15/86
4,600,102	06/611,722	7/15/86
4,600,106	06/552,738	7/15/86
4,600,111	06/732,266	7/15/86
4,600,119	06/632,307	7/15/86
4,600,127	06/706,736	7/15/86
4,600,139	06/523,437	7/15/86
4,600,147	06/514,441	7/15/86
4,600,148	06/542,437	7/15/86
4,600,152	06/501,621	7/15/86
4,600,170	06/542,403	7/15/86
4,600,175	06/662,267	7/15/86
4,600,179	06/723,741	7/15/86
4,600,180	06/703,031	7/15/86
4,600,183	06/685,456	7/15/86
4,600,190	06/674,152	7/15/86
4,600,191	06/676,771	7/15/86
4,600,193	06/533,437	7/15/86
4,600,197	06/714,901	7/15/86
4,600,198	06/676,755	7/15/86
4,600,199	06/425,402	7/15/86
4,600,209	06/626,716	7/15/86
4,600,214	06/696,301	7/15/86
4,600,216	06/732,093	7/15/86
4,600,223	06/697,336	7/15/86
4,600,238	06/691,390	7/15/86
4,600,239	06/730,494	7/15/86
4,600,250	06/564,935	7/15/86
4,600,252	06/582,899	7/15/86
4,600,253	06/706,324	7/15/86
4,600,258	06/758,069	7/15/86
4,600,267	06/696,660	7/15/86
4,600,269	06/515,156	7/15/86
4,600,272	06/714,403	7/15/86
4,600,298	06/585,081	7/15/86
4,600,300	06/466,298	7/15/86
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4,600,312	06/709,868	7/15/86
4,600,320	06/675,024	7/15/86
4,600,321	06/698,556	7/15/86
4,600,322	06/707,374	7/15/86
4,600,327	06/675,866	7/15/86
4,600,335	06/578,663	7/15/86
4,600,337	06/546,907	7/15/86
4,600,353	06/675,440	7/15/86
4,600,355	06/646,320	7/15/86
4,600,360	06/624,342	7/15/86
4,600,381	06/727,146	7/15/86
4,600,387	06/616,568	7/15/86
4,600,388	06/582,935	7/15/86
4,600,398	06/655,770	7/15/86
4,600,411	06/597,506	7/15/86
4,600,421	06/724,729	7/15/86
4,600,425	06/717,940	7/15/86
4,600,441	06/714,608	7/15/86
4,600,447	06/681,769	7/15/86
4,600,453	06/789,816	7/15/86
4,600,471	06/692,737	7/15/86
4,600,475	06/679,044	7/15/86
4,600,486	06/664,996	7/15/86
4,600,487	06/627,205	7/15/86
4,600,491	06/611,176	7/15/86
4,600,500	06/707,004	7/15/86
4,600,501	06/659,761	7/15/86
4,600,505	06/773,905	7/15/86
4,600,511	06/642,370	7/15/86
4,600,514	06/532,615	7/15/86
4,600,523	06/681,766	7/15/86
4,600,528	06/616,441	7/15/86
4,600,543	06/642,928	7/15/86
4,600,551	06/612,618	7/15/86
4,600,557	06/712,220	7/15/86
4,600,560	06/672,251	7/15/86
4,600,562	06/686,163	7/15/86
4,600,565	06/708,299	7/15/86
4,600,576	06/747,425	7/15/86
4,600,585	06/573,062	7/15/86
4,600,600	06/666,194	7/15/86
4,600,606	06/598,700	7/15/86
4,600,607	06/690,280	7/15/86
4,600,608	06/433,422	7/15/86
4,600,610	06/440,314	7/15/86
4,600,612	06/704,301	7/15/86
4,600,622	06/700,274	7/15/86
4,600,632	06/722,581	7/15/86
4,600,637	06/603,172	7/15/86
4,600,641	06/749,125	7/15/86
4,600,642	06/670,136	7/15/86
4,600,644	06/492,091	7/15/86
4,600,657	06/697,377	7/15/86
4,600,659	06/643,981	7/15/86
4,600,665	06/728,792	7/15/86
4,600,668	06/738,981	7/15/86
4,600,679	06/613,823	7/15/86
4,600,686	06/496,701	7/15/86
4,600,696	06/623,579	7/15/86
4,600,699	06/465,909	7/15/86
4,600,701	06/722,383	7/15/86
4,600,720	06/741,649	7/15/86
4,600,721	06/716,408	7/15/86
4,600,725	06/608,129	7/15/86
4,600,733	06/706,753	7/15/86
4,600,747	06/724,753	7/15/86
4,600,748	06/705,525	7/15/86
4,600,752	06/711,675	7/15/86
4,600,771	06/670,691	7/15/86
4,600,775	06/644,564	7/15/86
4,600,780	06/595,662	7/15/86
4,600,784	06/814,104	7/15/86
4,600,790	06/704,238	7/15/86
4,600,792	06/720,826	7/15/86

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4,600,805	06/638,150	7/15/86
4,600,81?	06/524,774	7/15/86
4,600,815	06/403,449	7/15/86
4,660,821	06/469,626	7/15/86
4,600,827	06/655,380	7/15/86
4,600,848	06/738,053	7/15/86
4,600,849	06/693,900	7/15/86
4,600,869	06/584,940	7/15/86
4,600,872	06/713,762	7/15/86
4,600,875	06/493,349	7/15/86
4,600,882	06/757,017	7/15/86
4,600,900	06/715,833	7/15/86
4,600,923	06/607,078	7/15/86
4,600,945	06/480,907	7/15/86
4,600,948	06/734,802	7/15/86
4,600,958	06/458,643	7/15/86
4,600,964	06/705,014	7/15/86
4,600,969	06/628,392	7/15/86
4,600,972	06/643,553	7/15/86
4,600,974	06/702,688	7/15/86
4,600,983	06/445,218	7/15/86
4,600,984	06/773,626	7/15/86
4,600,989	06/751,035	7/15/86
4,601,002	06/456,159	7/15/86
4,601,029	06/653,754	7/15/86
4,601,033	06/571,256	7/15/86
4,601,042	06/596,255	7/15/86
4,601,045	06/637,362	7/15/86
4,601,059	06/595,912	7/15/86

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b).

4,620,196, Re. S. N. 07/564,696, Filed Aug. 7, 1990, Cl. 346, METHOD AND APPARATUS FOR HIGH RESOLUTION INK JET PRINTING, Carl H. Hertz, et al., Owner of Record: *Inventor*, Attorney or Agent: Toby H. Kusmer, Ex. Gp.: 216

4,942,085, Re. S. N. 07/570,193, Filed Aug. 20, 1990, Cl. 428/288, METHOD OF MANUFACTURING A SAG-RESISTANT BONDED PARTICULATE ARTICLE, Gerald J. Guerro et al., Owner of Record: *American Cyanamid Co., Stamford, Conn.*, Attorney or Agent: Steven H. Flynn, Ex. Gp.: 154

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

Re. 31,852, Reexam. No. 90/002,115, Requested Aug. 24, 1990, Cl. 370/090, DATA TRANSMISSION, Olof Soderblom, Owner of Record: *Willemijn Houdstermaatschappj, Rotterdam, Netherlands*, Attorney or Agent: George Vande Sande, Pollock, Vande Sande & Priddy, Washington, D.C., Ex. Gp.: 263, Requester: Arnold, White & Durkee, Houston, Tex.

4,198,094, Reexam. No. 90/002,112, Requested Aug. 20, 1990, Cl. 297/306, WORKING CHAIR, Anders Bjerknes, et al., Owner of Record: *Anders Bjerknes & Reudi A Porta, Oslo, Norway*, Attorney or Agent: Shugrue, Mion, Zinn, MacPeak & Seas, Washington, D.C., Ex. Gp.: 357, Requester: Sit-Rite Group, Inc., Evergreen, Colo.

4,522,828, Reexam. No. 90/002,111, Requested Aug. 17, 1990, Cl. 514/646, THERAPEUTIC AGENTS, James E. Jefferey, et al., Owner of Record: *The Boats Co., Plc., Nottingham, England*, Attorney or Agent: Ostrolenk, Faber, Gerb & Soffen, New York, N. Y., Ex. Gp.: 124, Requester: Owner

4,552,899, Reexam. No. 90/002,116, Requested Aug. 24, 1990, Cl. 514/568, COUGH/COLD MIXTURES COMPRISING NON-STEROIDAL ANTI-INFLAMATORY DRUGS, Abraham Sunshine, et al., Owner of Record: *Analgesic Associates, Larchmont, N.Y.*, Attorney or Agent: Norman H. Stepno, Burns, Doane, Swecker & Mathis, Alexandria, Va., Ex. Gp.: 125, Requester: Owner

4,572,600, Reexam. No. 90/002,113, Requested Aug. 20, 1990, Cl. 339/14R, ELECTRICAL CONNECTOR FOR TRANSIENT SUPPRESSION, Gerald R. Nieman, Owner of Record: *ITT Corp., New York, N.Y.*, Attorney or Agent: T. L. Peterson, ITT Western Region, Woodland Hills, Calif., Ex. Gp.: 322, Requester: Thomas L. Peterson, ITT Corp., Santa Ana, Calif.

4,854,473, Reexam. No. 90/002,114, Requested Aug. 17, 1990, Cl. 220/335, SINGLE-PIECE SNAP HINGE CLOSURE, Werner F. Dunbach, Owner of Record: *Alfatechnic, A.G., Dietlikon, Switzerland*, Attorney or Agent: Thomas W. Speckman, Chicago, Ill., Ex. Gp.: 241, Requester: John Kurucz, Kane, Dalsimer, Sullivan, Kurucz, et al., New York, N.Y.

Errata

The following registration number appeared in the "Trademark Registrations Renewed" section of the Trademark Official Gazette of February 27, 1990 for a renewal term of ten years.

TM 178	840,269	February 27, 1990

Subsequently, the certificate of registration bearing the above-identified registration number was renewed for a term of 20 years, from December 12, 1987 to December 12, 2007. Hence, the registration remains active.

August 27, 1990

JEFFREY M. SAMUELS
Assistant Commissioner for Trademarks

Notice of Petition for Reinstatement

Edwin H. Crabtree of Denver, Colorado, and formerly of Wichita, Kansas, whose registration number is 26,720, and who has been suspended pursuant to 35 U.S.C. § 32 for a period of at least three years, has filed a petition for reinstatement. Granting of reinstatement is subject to, *inter alia*, establishing to the satisfaction of the Director of Enrollment and Discipline that granting the petition is not contrary to the public interest, and that the suspended or excluded practitioner has complied with the provisions of 37 CFR § 10.158 during his period of suspension or exclusion. 37 CFR § 10.160. Accordingly, information bearing upon Edwin H. Crabtree's good moral character and repute is material to his eligibility for reinstatement. Any information tending to affect the eligibility of Edwin H. Crabtree on moral, ethical, or other grounds should be furnished to the Director in a written communication addressed to the Commissioner of Patents and Trademarks, Box OED, Washington, D.C. 20231 on or before November 9, 1990.

August 29, 1990

CAMERON WEIFFENBACH
Director
Office of Enrollment and Discipline

Suspension

David A. Maxon of Warren, Michigan, whose registration number is 21,131, has been suspended from practice before the Patent and Trademark Office beginning September 2, 1990 for a period of two (2) years. This action is taken under the provisions of 35 U.S.C. 32.

August 27, 1990 CAMERON WEIFFENBACH, *Director*
Office of Enrollment and Discipline

Status of PTO Services

The following is an update of the status of PTO services for August 1990:

Service Item	FY 1990 Goal (Calendar Days)*	Monthly Average (Calendar Days)*
Filing Receipts:		
Patents	22	18
Trademarks	30	68
Patent/Trademark Copies:		
Special Window Coupons	24 Hours	16 Hours
Window Coupons	5	1
Mail Coupons	12	5
Letter Orders	16	12
Electronic Ordering Service (EOS)	11	2
Certified Copies:		
Trademark Registrations	21	21
Applications-As-Filed	17	7
File-Wrapper/Contents	N/A	8
Walk-up Certification	1	1
Patent Application Expedited	5	3
Trademark Search Library:		
Filing Pending Marks	23	52
Filing Reg. Certificates	Issue Date+2 days	On Goal
Filing Temp. Drawings	8	12
Assignments:		
Recording Patent-New Applications	20**	13
Recording Patent-Mail Room Recpts.	20	21
Return Patents-New Applications	34**	34
Return Patents-Mail Room Recpts.	34	40
Recording Trademarks	20	16
Returning Trademark Documents	34	29
Avg. Days from Issue Fee Payment to Issue Date	90-100	92
Issue Fee Receipts Mailed	4 weeks prior to Issue Date	1 Day Late
Patent Copies Available	95% on Issue Date	88% on Issue Date
Trademark Copies Available	95% on Issue Date	99% on Issue Date

* Unless otherwise noted.
** Goal reflects the number of days from the date the filing receipt is mailed.

August 31, 1990

THERESA A. BRELSFORD
Assistant Commissioner for Administration

PATENT NOTICES

Certificates of Correction For Week of September 25, 1990

D. 299,138	4,844,604	4,863,012	4,872,303
D. 303,156	4,845,015	4,863,333	4,873,094
4,598,525	4,845,458	4,863,460	4,873,370
4,626,418	4,846,951	4,863,724	4,873,503
4,627,019	4,847,732	4,864,012	4,873,849
4,636,582	4,848,907	4,864,019	4,873,987
4,713,337	4,849,428	4,864,471	4,874,083
4,758,041	4,849,699	4,865,036	4,874,449
4,774,099	4,851,714	4,865,911	4,874,768
4,781,797	4,852,183	4,866,899	4,874,950
4,782,096	4,853,756	4,867,139	4,875,090
4,794,425	4,854,753	4,867,422	4,875,399
4,797,900	4,854,860	4,867,822	4,875,597
4,810,693	4,855,021	4,868,032	4,875,636
4,816,484	4,856,406	4,869,083	4,875,896
4,822,234	4,856,443	4,869,147	4,876,152
4,823,852	4,857,084	4,869,364	4,876,497
4,823,936	4,857,585	4,869,770	4,876,999
4,823,941	4,858,334	4,869,817	4,877,114
4,824,034	4,859,431	4,869,963	4,877,161
4,824,684	4,859,738	4,870,102	4,877,226
4,825,727	4,860,010	4,870,214	4,877,578
4,826,271	4,860,611	4,870,215	4,877,933
4,828,729	4,860,632	4,870,216	4,877,972
4,830,432	4,860,991	4,870,221	4,878,197
4,835,275	4,861,218	4,870,395	4,878,522
4,835,517	4,861,450	4,870,702	4,878,598
4,837,253	4,861,834	4,870,961	4,878,656
4,837,632	4,861,933	4,871,119	4,878,965
4,838,752	4,862,108	4,871,758	4,879,177
4,839,228	4,862,199	4,871,842	4,879,248
4,839,447	4,862,456	4,872,037	4,886,045
4,844,190	4,862,958	4,872,080	4,886,468

Disclaimers

4,938,735.—*James L. Mitchell*, Springfield, Mo.; *Daniel P. Bexten*, Columbus, Miss. BELT TENSIONING SYSTEM, TENSIONER AND PARTS THEREFOR AND METHODS OF MAKING THE SAME. Patent dated July 3, 1990. Disclaimer filed April 30, 1990, by the assignee, Dayco Products, Inc.

The term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

4,938,127.—*Bernhard H. van Lengerich*, Ringwood, N.J. EXTRUDER AND CONTINUOUS MIXER ARRANGEMENT FOR PRODUCING AN AT LEAST PARTIALLY BAKED PRODUCT HAVING A COOKIE-LIKE CRUMB STRUCTURE INCLUDING A POST-EXTRUSION RADIO FREQUENCY DEVICE. Patent dated July 3, 1990. Disclaimer filed March 30, 1990, by the assignee, Nabisco Brands, Inc.

The term of this patent subsequent to August 21, 2007, has been disclaimed.

4,935,606.—*Frederick J. Geary*, Holland, Mich. METHOD OF OPERATING GAS FURNACE IGNITER. Patent dated June 19, 1990. Disclaimer filed April 16, 1990, by the assignee, Robertshaw Controls Co.

The term of this patent subsequent to February 28, 2006, has been disclaimed.

Dedication

3,946,358.—*Charles Donald Bateman*, Bellevue, Wash. AIRCRAFT GROUND PROXIMITY WARNING INSTRUMENT. Patent dated March 23, 1976. Dedication filed July 9, 1990, by the assignee, Sunstrand Data Control, Inc.

Hereby dedicates to the Public the remaining term of said patent.

Disclaimers and Dedications

4,813,630.—*Sidney H. Conn*, Statesville, N. C. ELECTRICALLY NON-CONDUCTIVE SUSPENSION CABLES FOR HOT AIR BALLOONS. Patent dated Mar. 21, 1989. Disclaimer and Dedication filed June 18, 1990, by the inventor.

Hereby disclaims and dedicates to the Public claims 1 through 6, 13 through 18, 20 through 25, 32 through 37 and 39 of said patent.

4,820,690.—*Harold Gregory*, Macclesfield; *Keith G. McCullagh*, Princes Risborough, both of United Kingdom. DUODENAL AND GASTRIC ULCER TREATMENT WITH ORAL UROGASTRONE. Patent dated April 11, 1989. Disclaimer and Dedication filed Feb. 26, 1990, by the assignee, G.D. Searle & Co., Ltd.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,910,367.—*Donald J. Akers*, Chicago; *Douglas J. Walker*, Orland Park, both of Ill. VISIBLE BREAK SWITCH. Patent dated Mar. 20, 1990. Disclaimer and Dedication filed July 30, 1990, by the assignee, Joslyn Corp.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

4,922,199.—*Ronald D. Fukui*, Portage, Mich.; *Wataru Ichikawa*, Fuchu; *Kazuya Sakamoto*, Akishima, all of Japan. ROTARY POSITION TRANSDUCER HAVING HINGED CIRCUIT BOARDS. Patent dated May 1, 1990. Disclaimer and Dedication filed May 21, 1990, by the assignees, Enprotech Corp. and SG Co., Ltd.

Hereby disclaims and dedicates to the Public the remaining term of said patent.

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Box Pat. Ext.	Applications for patent term extension.
Box PCT	Mail related to applications filed under the Patent Cooperation Treaty.
Box Reexam	Mail related to Reexamination.
Box SN	For fee and petitions under 37 CFR 1.182 to obtain date received and/or serial number for patent application *prior* to the Office's standard notification (return post card or the official "Filing Receipt," "Notice to File Missing Parts," or "Notice of Incomplete Application").
PATENT APPLICATION	New patent application and associated papers and fees.
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Box Assignments	All assignment documents except those filed in new patent applications.
Box SEQUENCE	All application papers, computer readable forms and fees related to applications containing nucleotide sequence and/or amino acid sequence disclosures in accordance with 37 CFR §§ 1.821 through 1.825.

Reference Collection of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries (PDLs), receive current issues of U.S. Patents and maintain collections of earlier-issued patents. The scope of these collections varies from library to libary, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
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Arkansas	Little Rock: Arkansas State Library	(501) 682-2053
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale Patent Clearinghouse	(408) 730-7290
Colorado	Denver Public Library	(303) 640-8847
Connecticut	New Haven: Science Park Library	(203) 786-5447
Delaware	Newark: University of Delaware Library	(302) 451-2965
Dist. of Columbia	Washington: Howard University Libraries	(202) 636-5060
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	Miami-Dade Public Library	(305) 375-2665
	Orlando: University of Central Florida Libraries	(407) 275-2562
	Tampa: Tampa Campus Library, University of South Florida	(813) 974-2726
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
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	St. Louis Public Library	(314) 241-2288 Ext. 390
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	Piscataway: Library of Science and Medicine, Rutgers University	(201) 932-2895
New Mexico	Albuquerque: University of New Mexico General Library	(505) 277-4412
New York	Albany: New York State Library	(518) 473-4636
	Buffalo and Erie County Public Library	(716) 858-7101
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D.H. Hill Library, North Carolina State University	(919) 737-3280
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	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 292-6175
	Toledo/Lucas County Public Library	(419) 259-5212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 744-7086
Oregon	Salem: Oregon State Library	(503) 378-4239
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	Pittsburgh, Carnegie Library of	(412) 622-3138
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Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
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	Milwaukee Public Library	(414) 278-3247

PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF July 28, 1990

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director.	7-7-87
ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director	11-21-88
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director	5-12-88
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	8-3-88
BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director	1-28-87
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director	10-15-87
SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director	8-15-88
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—G. GOLDBERG, Director	3-8-88
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director	12-22-88
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—EDWARD E. KUBASIEWICZ, Director.	8-29-88
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director	4-22-88
DESIGN, GROUP 290—ROBERT E. GARRETT, Director	1-21-87
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-3-89
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director	6-23-88
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director	10-25-88
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—C. CROYLE, Acting Director	3-16-89
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director	8-15-89

Expiration of patents: The patents within the range of numbers indicated below expire during July 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents	Numbers 3,742,517 to 3,750,191 inclusive
Plant Patents	3,370 to 3,384 inclusive

REEXAMINATIONS

SEPTEMBER 25, 1990

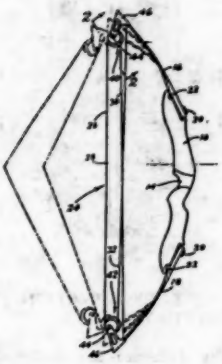
Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

B1 4,060,066 (1356th)

COMPOUND ARCHERY BOW WITH ECCENTRIC CAM ELEMENTS

Donald S. Kudlacek, 3412 Oak St., Longview, Wash. 98632

Reexamination Request No. 90/001,881, Nov. 3, 1989.
Reexamination Certificate for Patent No. 4,060,066, issued Nov. 29, 1977, Ser. No. 639,649, Dec. 11, 1975.
Int. Cl.[5] F41B *5/10*
U.S. Cl. 124—25.6



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1 and 2 is confirmed.

1. A compound archery bow comprising:

a. a handle member,

b. a pair of bow limbs projecting from opposite ends of the handle member,

c. a pair of cam members each comprising a pair of cam elements of different diameters secured together eccentrically and having a common pivot axis which is eccentric with respect to both cam elements,

d. a pivot member on the outer end of each limb pivotally mounting one of the cam members on said pivot axis which is eccentric with respect to both cam elements, and

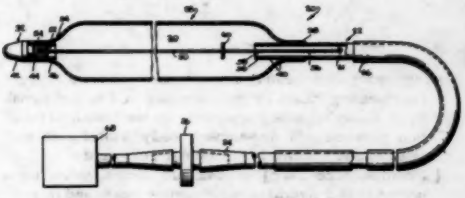
e. a bow string having a medial working stretch segment for projecting an arrow and opposite end segments each extending therefrom and wrapped first over the peripheral surface of the larger diameter cam element of the associated cam member, thence over the peripheral surface of the smaller diameter cam element and being secured to the cam member, and thence extending from the smaller diameter cam element of the associated cam member to attachment with the opposed limb.

B1 4,261,339 (1357th)

BALLOON CATHETER WITH ROTATABLE SUPPORT

Bruce L. Hanson, Wayne, N.J., and Sidney Wolvek, Brooklyn, N.Y., assignors to Datascope Corp.

Reexamination Request Nos. 90/001,131, Dec. 1, 1986 and 90/001,686, Jan. 6, 1989.
Reexamination Certificate for Patent No. 4,261,339, issued Apr. 14, 1981, Ser. No. 883,513, Mar. 6, 1978.
Int. Cl.[3] A61M *25/10*
U.S. Cl. 606—194



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1-21 and 23-36 is confirmed.

Claim 22 is cancelled.

1. A catheter comprising an inflatable and deflatable chamber having a proximal end and a distal end, said chamber in use being adapted to have substantially the same surface area when inflated and when deflated, a catheter tube portion connected at or adjacent an end thereof to the proximal end of said chamber and having a passage communicating with the interior of said chamber for admitting fluid into and withdrawing fluid from said chamber, support means for supporting said chamber extending in said chamber from the distal end thereof to said catheter tube portion and terminating in said catheter tube portion, said support means being non-rotatably connected to one of said ends of said chamber and rotatably coupled to the other of said ends of said chamber to permit relative angular motion between said support means and said chamber when said chamber is twisted about its longitudinal axis such that a configuration of said catheter may be obtained in which said chamber is wrapped about said support means, whereby insertion of said catheter into a body passageway or the like is aided.

B1 4,436,092 (1358th)

EXERCISE RESPONSIVE CARDIAC PACEMAKER

William A. Cook, Bloomington; Neal E. Fearnot, and Leslie A. Geddes, both of West Lafayette, all of Ind., assignors to Purdue Research Foundation, Lafayette, Ind.

Reexamination Request No. 90/001,612, Oct. 3, 1988.
Reexamination Certificate for Patent No. 4,436,092, issued Mar. 13, 1984, Ser. No. 379,667, May 19, 1982.
Int. Cl.[3] A61N *1/365*
U.S. Cl. 128—419 PG

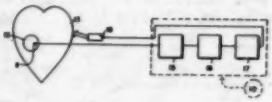
AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claims 1 and 7 are determined to be patentable as amended.

Claims 2–6 and 8–9, dependent on an amended claim, are determined to be patentable.

1. A cardiac pacemaker [including means] for [variably] controlling the stimulation rate of the heart according to the level of muscular exertion in the body, comprising:

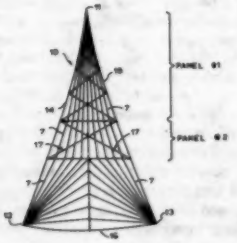
a temperature sensing means for sensing a non-ambient body temperature, said non-ambient body temperature related by analgorithm to heart rate in a normally functioning heart, said temperature sensing means producing an output signal;



an algorithm implementing means connected to said temperature sensing means for implementing said output signal by an algorithm which represents the mathematical function between said non-ambient body temperature and heart rate in a normally functioning heart; and

[a cardiac pacemaker] *variable rate control means* connected to said algorithm implementing means and responsive thereto in order to variably control the stimulation rate of said heart.

B1 4,708,080 (1359th)
COMPOSITE THREAD LINE SAILS
Peter G. Conrad, Old Lyme, Conn., assignor to CTL, Inc.
Reexamination Request No. 90/001,795, Jun. 22, 1989.
Reexamination Certificate for Patent No. 4,708,080, issued Nov. 24, 1987, Ser. No. 873,188, Jun. 11, 1986.
Int. Cl.[5] B63H *9/06*
U.S. Cl. 114—103



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

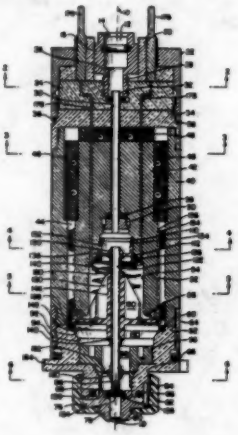
The patentability of claims 1, 2, 4–11, 16 & 17 is confirmed.

Claims 3, 12–15 are determined to be patentable as amended.

New claims 18–30 are added and determined to be patentable.

1. A composite sail having a head, a tack and a clew, which in use and for an intended purpose has principal stress lines, said sail comprised of a plurality of panels, each of said panels joined to an adjacent panel therefor, each of said panels comprised of a laminate of at least two layers whereinbetween said layers nonwoven, force-bearing thread material is predeterminedly disposed along said principal stress lines for said panel in said sail.

B1 4,848,725 (1360th)
VALVE CONSTRUCTION
Edward C. Tibbals, Jr., Jamestown, N.C., assignor to Interface, Inc., La Grange, Calif.
Reexamination Request No. 90/001,921, Jan. 8, 1990.
Reexamination Certificate for Patent No. 4,848,725, issued Jul. 18, 1989, Ser. No. 140,546, Jan. 4, 1988.
Int. Cl.[5] F16K *31/08*
U.S. Cl. 251—129.02



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–20 is confirmed.

New claim 21 is added and determined to be patentable.

1. In a valve assembly for control of fluid flow having fluid inlet port means,

fluid outlet port means,

a valve seat associated with said fluid outlet port means,

the improvement comprising

a valve stem supported by elastically deformablediaphragm means to permit selective displacement thereof along a predetermined lineal axis intermediate a first limiting position in sealing relation with said valve seat for preventing fluid flow therepast for discharge through said outlet port means and a second limiting position remote from said valve seat for permitting fluid flow therepast for discharge through said outlet port means,

a pair of fixed magnetic pole elements disposed coaxial with said lineal axis and in concentric spaced relation to each other,

flux generating means for establishing a substantially constant magnetic flux between said pair of pole elements in a direction substantially perpendicular to said lineal axis,

an armature assembly mounted on said valve stem and displaceable in direction to said lineal axis fordisplacing said valve stem between its first and second limiting positions,

said armature assembly including a coil member capable of carrying electrical current disposed in said magnetic flux intermediate said pair of fixed magnetic pole elements and

means for regulating the magnitude, duration and direction of electrical current flow through said coil member to control the speed and direction of displacement of said armature assembly relative to said first and second positions.

REISSUES

SEPTEMBER 25, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

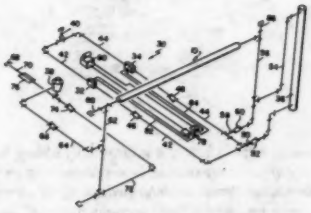
Re. 33,346
PROCESS AND APPARATUS FOR TESTING FLUIDS FOR FOULING

James G. Knudsen, Corvallis, Oreg., and Nicholas J. Brindak, Auburn, N.Y., assignors to Drew Chemical Corporation, Boonton, N.J.

Original No. 4,339,945, dated Jul. 20, 1982, Ser. No. 202,351, Oct. 30, 1980. Application for reissue Feb. 23, 1989, Ser. No. 313,825

Int. Cl.[5] G01N *17/00*

U.S. Cl. 73—61.2 18 Claims



1. An apparatus for testing a fluid to monitor and record fouling data together with other parameters which comprises:

a piping assembly including *a* fluid inlet and outlet [means] and a heat transfer test assembly, said heat transfer test assembly including a heating member [including] *with a* heating element disposed within a conduit means having a passageway for said fluid;

means for measuring temperature of said fluid entering said heat transfer test assembly;

means for supplying electrical energy of a preselect quantity to said heating element;

means for measuring a wall temperature of said heating element;

flow means for measuring velocity of said fluid through said conduit means;

means for measuring [a parameter selected from the group consisting of] *parameters of said fluid comprising* corrosion, pH and conductivity; and

means for simultaneously recording said preselect quantity of electrical energy to said heating element, said measured temperature of said fluid, said measured wall temperature of said heating member, said measured velocity of said fluid through said piping assembly and said measured [parameter] *parameters.*

Re. 33,347
AIR-DRIVEN CEILING FAN

Johnny Johnson, III, 1815 Halsey Ave., New Orleans, La. 70114

Original No. 4,598,632, dated Jul. 8, 1986, Ser. No. 428,889, Sep. 30, 1982. Application for reissue Jul. 8, 1988, Ser. No. 216,952

Int. Cl.[5] F24F *13/06*

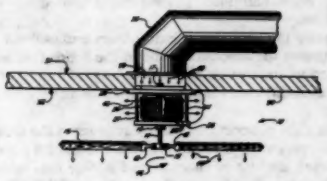
U.S. Cl. 98—40.05 7 Claims

5. An air-driven fan apparatus comprising:

(a) a housing;

(b) means for positioning the housing adjacent an opening in the ceiling of a room, the opening having duct work means positioned thereabove, the duct work means communicating with the opening for providing air flow through the opening into the room along an air flow path;

(c) blower means disposed in the housing to receive air flow from the duct work means, the blower means including a plurality of spaced-apart vanes which surround the opening so that air flow between the duct work means and the room passes through the vanes before entering the room, the vanes being



shaped and positioned such that the blower means rotates when air flows from the duct work means through the vanes into the room; and

(d) means to direct the air flow laterally out of the blower.

Re. 33,348
BONE SCREW

Jerry L. Lower, Bourbon, Ind., assignor to Zimmer, Inc., Warsaw, Ind.

Original No. 4,640,271, dated Feb. 3, 1987, Ser. No. 795,963, Nov. 7, 1985. Application for reissue Jun. 10, 1988, Ser. No. 205,128

Int. Cl.[5] A61B *17/58*

U.S. Cl. 606—65 16 Claims

11. A bone screw for connecting portions of bone across a fracture therebetween, comprising:

(a) a shaft comprising a leading end portion including a first set of threads and an elongated unthreaded portion extending therefrom;

(b) a sleeve member having an inner surface surrounding the elongated unthreaded portion and being freely slidable relative to the unthreaded portion of the shaft, the bone screw not having any resilient means between the sleeve member and the unthreaded portion, the sleeve member including a second set of threads thereon; and

(c) a means for driving the bone screw.

Re. 33,349
CONTROLLING SULFIDE SCAVENGER CONTENT OF DRILLING FLUID

Stephen D. Matza, Stafford; William E. Ellington, and Henry C. Fleming, III, both of Houston, all of Tex., assignors to Shell Oil Company, Houston, Tex.

Original No. 4,658,914, dated Apr. 21, 1987, Ser. No. 784,422, Oct. 4, 1985. Continuation-in-part of Ser. No. 609,611, May 14, 1984, abandoned. Application for reissue Feb. 19, 1988, Ser. No. 158,828

Int. Cl.[5] E21B *44/00, 47/10;* G01N *31/02, 33/24*

U.S. Cl. 175—40 11 Claims

1. In a process for drilling a well with a water based drilling

fluid containing zinc based scavengers for controlling encountered sulfide ions, in which process analyses are made for monitoring and controlling the amount of scavenger in the drilling fluid, an improved process for controlling the adequacy of the scavenging capability, comprising:

mixing one part by volume of a sample of circulating drilling fluid with about 4 to 10 parts by volume of a selective solvent for zinc ions, with said solvent [containing a kind and amount of buffering material] providing a pH of about 4 to 6, and being capable of dissolving substantially all of the zinc present in the drilling fluid except for zinc ions combined into [precipitated molecules of] zinc sulfides;

separating the resulting solution from undissolved solids;

determining the amount of zinc in the solids-free solution in order to determine the proportion of the unspent zinc based sulfide scavenger in the circulating drilling fluid; and

adjusting the proportion of the scavenger in the drilling fluid to the excent required to provide enough for scavenging a selected amount of encountered sulfide ions without providing enough to impair the rheology of the drilling fluid.

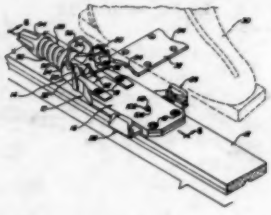
Re. 33,350

SKI BINDING HAVING PRESET MEANS AND DETENT TRIGGER FOR SAID PRESET MEANS

Original No. 4,063,752, dated Dec. 20, 1977, Ser. No. 677,787, Apr. 16, 1976. Application for reissue Dec. 19, 1979, Ser. No. 105,287

Int. Cl.[3] **A63C** *9/086*

U.S. Cl. 280—624 **30 Claims**



1. A ski binding adapted to releasably secure a ski to an associated ski boot comprising:

a first binding component in the form of a substantially rigid latch receiving member provided with at least one latch receiver formation;

and a second binding component in the form of a substantially rigid latch mounting body;

one of said components being constructed for permanent connection to a ski boot and the other component being constructed for permanent connection to a ski;

latch means movably mounted on the body for movement between inoperative position substantially free of the latch receiving member and operative position in latching engagement with the receiver formation;

a resilient force unit carried by the body and adjustable between a no-load condition and a loading condition;

link means connecting the force unit to the latch means and movable to transmit the force of the force unit to the latch means to yieldingly urge the latter into operative position;

and a detent trigger mounted on the body and movable between a first interfering position engaging the link means to restrain it against movement in the latching direction in response to the urging of the force unit in loading condition and a second non-interfering position;

the trigger being settable in the first position to restrain the link means against latching movement and being actuatable by a skier upon placing his boot in skiing position on the ski to move to the second position and release the link means to allow it to move and transmit the force of the force unit to the latching means and yieldingly urge it into latching engagement with the receiver formation.

Re. 33,351

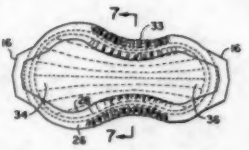
MENSTRUAL AND INCONTINENCE PAD

Elissa D. Papajohn, 65 Montague St., Brooklyn, N.Y. 11201

Original No. 4,758,241, dated Jul. 19, 1988, Ser. No. 63,413, Jun. 18, 1987. Application for reissue Nov. 22, 1989, Ser. No. 440,507

Int. Cl.[5] **A61F** *13/16*

U.S. Cl. 604—387 **2 Claims**



2. A sanitary napkin having a substantially oblong body formed of a plurality of vertically stacked layers comprising an underply of fluid impervious material, an intermediate ply of absorbent material, an upperply of highly fluid pervious material, and a peripheral binding ply of fluid impervious material having an inner and outer peripheral edge and defining a central opening into the body, said plies being secured together about their outer peripheral edge and including an elastomeric member along each of the longitudinal side edges of the body, which resiliently contracts the body in the longitudinal direction drawing the body into a cup shape providing a deep compartment for retaining fluid between said underply and said intermediate ply and at the same time, raising the inner peripheral edge of said binding ply to form a continuous encircling wall against the flow of fluid from the compartment.

Re. 33,352

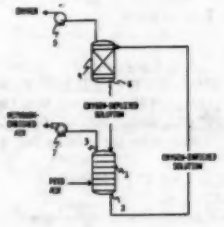
ABSORPTION PROCESS FOR PRODUCING OXYGEN AND NITROGEN AND SOLUTION THEREFOR

Ian C. Roman, Wilmington, Del., and Richard W. Baker, Palo Alto, Calif., assignors to Bend Research, Inc., Bend, Oreg.

Original No. 4,451,270, dated May 29, 1984, Ser. No. 393,711, Jun. 30, 1982. Application for reissue Apr. 1, 1986, Ser. No. 848,032

Int. Cl.[5] **B01D** *19/00*

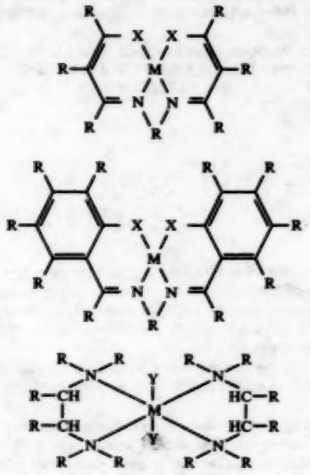
U.S. Cl. 55—38 **27 Claims**



36. A process for the separation and purification of oxygen comprising:

(a) bringing a gaseous, oxygen-containing feed stream into contact with a solution containing a solvent or solvent mixture, an axial base and an oxygen carrier, said solvent or solvent mixture being capable of dissolving the axial base and

the oxygen carrier when they are present together, said axial base being capable of providing a coordinating atom to the oxygen carrier, and said oxygen carrier being a metal-containing complex having any of the structures



wherein

M is a metal selected from cobalt, iron, copper, nickel, manganese, ruthenium or rhodium;

X is —O—, —S—,

R is hydrogen, alkyl, aryl, halogen, alkoxy or a nitrogen-containing moiety; and

Y is halide, nitrate, thiocyanate or cyanide;

said solution absorbing oxygen from said gaseous oxygen-containing feed stream;

(b) desorbing oxygen from said solution to a gaseous product stream; and

(c) collecting oxygen from the product stream after the oxygen has been desorbed.

Re. 33,353

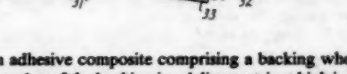
THIN FILM SURGICAL DRESSING WITH DELIVERY SYSTEM

Steven B. Heinecke, New Richmond, Wis., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Original No. 4,598,004, dated Jul. 1, 1986, Ser. No. 695,042, Jan. 24, 1985. Application for reissue May 31, 1989, Ser. No. 359,833

Int. Cl.[5] C09J 7/02; A61F 13/02

U.S. Cl. 428—40 **11 Claims**



1. An adhesive composite comprising a backing wherein at least one edge of the backing is a delivery strip which is separable by perforations from the remainder of the backing;

a pressure sensitive adhesive coated on at least a portion of one surface of the backing; and

a liner which is adhered to the delivery strip with sufficient tenacity to result in separation along the perforations of the delivery strip from the remainder of the backing before the liner separates from the delivery strip and which liner is releasably adhered to the remainder of the backing, ***wherein the liner is strip coated with releasing agent such that the portion contacting the delivery strip is free of releasing agent and the portion contacting the remainder of the film has releasing agent.***

Re. 33,354

PROCESS FOR USING ESTER PLASTICIZED POLYURETHANES FOR SEALING ELECTRICAL DEVICES

William J. Downey, Linden; Melvin Brauer, East Brunswick, and Jerry C. Chao, Bayonne, all of N.J., assignors to CasChem, Inc., Bayonne, N.J.

Original No. 4,705,724, dated Nov. 10, 1987, Ser. No. 945,981, Dec. 24, 1986. Division of Ser. No. 837,554, Mar. 3, 1986, Pat. No. 4,666,968, which is a continuation-in-part of Ser. No. 713,377, Mar. 19, 1985, abandoned. Application for reissue Oct. 30, 1989, Ser. No. 429,118

The portion of the term of this patent subsequent to Nov. 10, 2004, has been disclaimed.

Int. Cl.[5] B32B 27/04, 27/06, 27/22, 27/40

U.S. Cl. 428—375 **22 Claims**

1. A process for providing a fluid impervious protective seal around an insulated electrical device which comprises introducing the components of a polyurethane gel composition comprising about 10 to 90 parts by weight of the liquid reaction product of an organic polyisocyanate and a polyol having an equivalent weight above 250 in the presence of about 90 to 10 parts by weight of an ester plasticizer compound having a total solubility parameter of [between about 8.3 and 8.9 or] between about 9.1 and [9.7] *10.1* into a confined space surrounding the section of a device to be protected and allowing said composition to cure to a gel.

Re. 33,355

AGENT FOR ABSORBING AND RELEASING WATER VAPOR

Hiroshi Itoh, Yokohama; Toshimi Nakagawa, Fujisawa; Atsuhiko Nitta, Yokohama; Tomio Tanaka, Tokyo; Hideo Kamio, Odawara; Ryosuke Enoshita, Nagoya; Tamotu Uejima, Tohkai; Takahiro Ouchi, Tokyo; Kazuki Abe, and Sadao Kobayashi, both of Yokohama, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Original No. 4,683,258, dated Jul. 28, 1987, Ser. No. 820,887, Jan. 17, 1986. Continuation of Ser. No. 724,163, Apr. 17, 1985, abandoned. Application for reissue May 16, 1988, Ser. No. 194,965

Claims priority, application Japan, Oct. 22, 1983, 58-197875; May 28, 1984, 59-106468; May 28, 1984, 59-106550; May 28, 1984, 59-106551; May 28, 1984, 59-106554; May 28, 1984, 59-106463

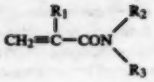
Int. Cl.[5] C08K 3/18; B05D 5/06

U.S. Cl. 524—434 **14 Claims**

1. A process of humidity control by contacting humid gas with an agent for absorbing and releasing water vapor, said agent comprising the combination of:

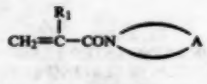
(A) from 95 to 3 wt. % of a water insolubilized product prepared from:

(a) a homopolymer of a monomer selected from the group consisting of N-alkyl- and N-alkylene-substituted (meth)acrylamides of formula (I):



(I)

wherein R_1 is hydrogen or methyl, R_2 is hydrogen, methyl or ethyl, and R_3 is methyl, ethyl or propyl and formula (II):



(II)

wherein R_1 is hydrogen or methyl, and A is $—(CH_2)_n—$, wherein n is an integer of 4 to 6, or $—(CH_2)_2—O—(CH_2)_2—$;

(b) a first copolymer of at least two monomers selected from the group consisting of said N-alkyl- and N-alkylene-substituted (meth)acrylamides; or

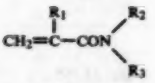
(c) a second copolymer of at least one monomer selected from the group consisting of said N-alkyl- and N-alkylene-substituted (meth)acrylamides and at least one monomer other than said N-alkyl- and N-alkylene-substituted (meth)acrylamides which is copolymerizable with the N-alkyl- and N-alkylene-substituted (meth)acrylamides; and

(B) from 5 to 97% by wt. of a hygroscopic material selected from the group consisting of metal halides and metal perchlorates.

10. A process of preventing fogging of a transparent material by forming a layer of an agent thereon, comprising the steps of:

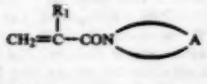
(A) forming a layer of said agent prepared from:

(a) a monomer or a homopolymer of a monomer selected from the group consisting of N-alkyl- and N-alkylene-substituted (meth)acrylamides of formula (I):



(I)

wherein R_1 is hydrogen or methyl, R_2 is hydrogen, methyl or ethyl, and R_3 is methyl or ethyl and formula (II):



(II)

wherein R_1 is hydrogen or methyl, and A is $—(CH_2)_n—$, wherein n is an integer of 4 to 6, $—(CH_2)_2—O—(CH_2—)_2$;

(b) a first comonomer or a first copolymer of at least two monomers selected from the group consisting of said N-alkyl- and N-alkylene-substituted (meth)acrylamides; or

(c) a second comonomer or a second copolymer of at least one monomer selected from the group consisting of said N-alkyl- and N-alkylene-substituted (meth)acrylamides and at least one monomer other than said N-alkyl and N-alkylene-substituted (meth)acrylamides which is copolymerizable with the N-alkyl- and N-alkylene-substituted (meth)acrylamides; and

(B) insolubilizing said agent by heating said layer to 60°–250° C. or by exposing said layer to UV light or δ-rays.

Re. 33,356

FREQUENCY MODULATION CODING METHODS WITH REDUCED TRANSITION INTERVALS

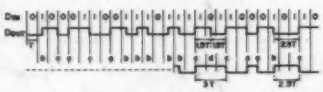
Masato Tanaka, Tokyo, and Takuji Himeno, Funabashi, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Original No. 4,672,363, dated Jun. 9, 1987, Ser. No. 705,345, Jun. 15, 1984. Application for reissue Jun. 6, 1989, Ser. No. 362,159

Claims priority, application Japan, Jun. 17, 1983, 58-108697; PCT Int'l Appl., Feb. 15, 1985, PCT/JP84/00312

Int. Cl.[5] H03M 7/38

U.S. Cl. 341—72 **6 Claims**



1. A method of modulating digital data of a data bit series consisting of bits within respective bit cells of predetermined length, and each having a first or second state whereby a state transition is caused to satisfy predetermined conditions, comprising the steps of:

(a) causing the transition at a boundary portion of a bit cell which is bounded on either side by bits having said second state;

(b) causing the transition at a central portion of a bit cell of a bit having said first state, [unless there are] *except each bit cell of the last two bits of* an even number of bits of said first state bounded on either side by bits of said second state [or unless a pattern formed of a bit of said first state and a bit of said second state occurs after an even number of bits of said first state follow a bit of said second state];

(c) determining an even number of bits having said first state which are bounded on either side by bits having said second state, [inhibiting the transition at a central portion of each bit cell of the last two bits having the first state,] and causing the transition at a boundary portion of said *last* two bit cells *of said even number of bits* having the first state; and

(d) determining when a pattern formed of a bit having said second state and a bit having said first state appears after an even number of bits having the first state follow a bit having the second state and causing the transition at a central portion of a bit cell of the bit having the second state in said pattern.

Re. 33,357

OPTICAL INSPECTION APPARATUS FOR MOVING ARTICLES

Malcolm W. Randall, Milton-Freewater, Oreg., assignor to Key Technology, Inc., Milton-Freewater, Oreg.

Original No. 4,581,632, dated Apr. 8, 1986, Ser. No. 699,938, Feb. 8, 1985. Division of Ser. No. 496,992, May 27, 1983, Pat. No. 4,520,702, which is a continuation-in-part of Ser. No. 388,138, Jun. 14, 1982, abandoned. Application for reissue Jul. 14, 1987, Ser. No. 72,987

Int. Cl.[5] H04N 7/18

U.S. Cl. 358—106 **35 Claims**

1. An apparatus for optically inspecting articles, comprising:

means for moving articles successively past an inspection station;

scanning camera means mounted at the inspection station for repeatedly scanning a viewing area extending transversely across the inspection station at a selected scan speed and frequency to visually inspect the articles as the articles pass through the viewing area;

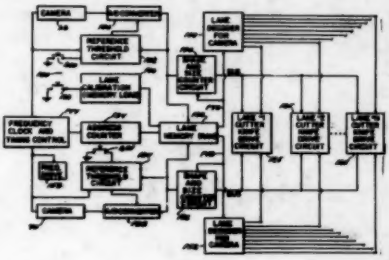
means for directing radiant energy onto the articles within the viewing area;

said scanning camera means having an array of photo-electric transducers for receiving radiant energy through a

viewing lens having an optical axis intersecting the viewing area, in which each photo-electric transducer is focused on a transverse segment of the viewing area for generating an electrical signal which corresponds to the magnitude of radiation received by the photo-electric transducer from its corresponding transverse segment of the viewing area;

threshold means for generating article data signals by comparing the magnitude of the electrical signal produced by each transducer and a threshold reference value;

and control means operatively connected to the scanning camera means, said control means including viewing off-axis angle correcting means for varying the relationship between the threshold reference value and the electrical signals during each scan in relation to the angular distance between the transverse segment of the viewing area corresponding to each transverse segment of the viewing area



being observed by each transducer and the camera optical axis.

PLANT PATENTS

GRANTED SEPTEMBER 25, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

7,333

ROSE PLANT TANCRESOR

Hans Evers, Uetersen, Fed. Rep. of Germany, assignor to Jackson & Perkins Company, Medford, Oreg.

Filed Mar. 6, 1989, Ser. No. 319,648
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—20 1 Claim

1. A new and distinct variety of rose plant of the Hybrid Tea class substantially as herein shown and described, characterized particularly as to novelty by the unique combination of outstanding vigor, upright habit of growth, leathery foliage, thick petals and abundant large red flowers.

7,334

ROSE PLANT—MEICHEVIL VARIETY

Marie-Louise Meilland, deceased, late of Antibes (by Jean-Pierre Le Naour, legal representative), assignor to The Conard-Pyle Company, West Grove, Pa.

Filed Mar. 9, 1989, Ser. No. 321,142
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—28 1 Claim

1. A new and distinct variety of Floribunda rose plant characterized by the following combination of characteristics:

(a) forms in abundance attractive semi-double blossoms which are cardinal in coloration and exhibit an exceptionally long vase life,
(b) exhibits a semi-erect growth habit,
(c) exhibits vigorous vegetation, and
(d) is particularly well suited for cut flower production;

substantially as herein shown and described.

7,335

PLUM TREE, "FIRST BEAUT"

Charles H. Neufeld, 38250 Road 52, Kingsburg, Calif. 93631

Filed Sep. 11, 1989, Ser. No. 405,771
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—38 1 Claim

1. A new and distinct variety of plum tree to be denominated varietally as First Beaut substantially as illustrated and described and which is characterized principally as to novelty by its production of fruit which are somewhat similar in their overall appearance and other physical characteristics to the fruit produced by the Red Beaut plum tree (U.S. Plant Pat. No. 2,539) from which it was derived as a chance mutation, but which is distinguished therefrom by producing fruit which are ripe for commercial harvesting and shipment approximately five days earlier than the fruit produced by the Red Beaut plum tree.

7,336

PEACH TREE (SNOW DIAMOND)

Mitchell Langford; Rose M. Langford, both of Reedley, and Vernon Langford, Woodlake, all of Calif., assignors to Plum-Cot, Inc., Calif.

Filed May 22, 1989, Ser. No. 355,647
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—42 1 Claim

1. A new and distinct variety of peach tree, substantially as illustrated and described, which bears whiteflesh freestone fruit that is large and uniform in size, mostly red in skin color, firm in texture, and which most nearly resembles the Babcock (unpatented) variety, but is distinguished from and an improvement of that variety by bearing fruit that has a higher degree of red skin color, has a smaller stone, matures approximately two weeks later, and is very much firmer and more suitable for long distance shipping by the commercial grower.

7,337

PRUNUS PERSICA SPRAGUE PEACH BUSH

James W. Sprague, 1605 S. Mountain Ave., Apt. 5, Ontario, Calif. 91761

Filed Feb. 26, 1990, Ser. No. 484,839
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—43 1 Claim

1. A new and distinct variety of *Prunus persica* as described and shown herein characterized particularly by the short, bushy shape of its trees and by the firmness and substantially virus-free nature of its fruit.

7,338

DISTINCT VARIETY OF POINSETTIA NAMED H-477/86 RED

Alexander Hrebenluk, R.D. -190 1, Box 118, Sugar Run, Pa. 18846

Filed Apr. 17, 1989, Ser. No. 338,951
Int. Cl.[5] A01H 5/00
U.S. Cl. Plt.—86 1 Claim

1. A new and distinct variety of Poinsettia plant as herein shown and described, particularly characterized by its dark green leaves, bright red bracts, triple form, prolific bract development, large bloom side, and good shipping characteristics.

7,339

SHIITAKE MUSHROOM PLANT NAMED 'HOKKEN 601'

Sadayuki Inoue, Mibu, and Sumio Ayusawa, Utsunomiya, both of Japan, assignors to Hokken Sangyo Co., Ltd., Tochigi, Japan

Filed Jul. 18, 1988, Ser. No. 217,564
Claims priority, application Japan, Jul. 20, 1987, 2384
Int. Cl.[5] A01H 15/00
U.S. Cl. Plt.—89 1 Claim

1. A new and distinct variety of shiitake mushroom substantially as shown and described.

PATENTS

GRANTED SEP. 25, 1990

ERRATA

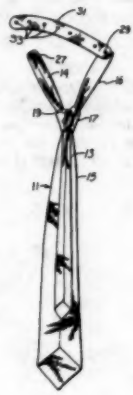
For CLASS	See PATENT NO.
004-236	4,958,387
019-098	4,958,404
043-124	4,958,456
037-094	4,958,457
052-169	4,958,465
091-420	4,958,548
606-194	4,958,643
160-348	4,958,646
181-129	4,958,697
187-101	4,958,707
222-460	4,958,741
192-085	4,958,753
280-696	4,958,863
604-044	4,958,901
404-040	4,958,964
514-021	4,959,096
260-402	4,959,187
514-021	4,959,213
435-172	4,959,327
558-161	4,959,455
361-310	4,959,652
346-140	4,959,673
346-140	4,959,674
364-401	4,959,686
357-016	4,959,694
324-418	4,959,784
381-010	4,959,859
346-140	4,959,863

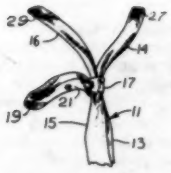
PATENTS

GRANTED SEPTEMBER 25, 1990

GENERAL AND MECHANICAL

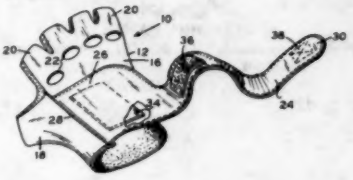
4,958,383
SNAP-ON TIE WITH SLIDER SIMULATING WINDSOR KNOT
Richard A. Thompson, Harrison, Ark., assignor to Robert R. Keegan, Fayetteville, Ark.
Filed Feb. 9, 1989, Ser. No. 309,823
Int. Cl.[5] A41D *25/10*
U.S. Cl. 2—150 **15 Claims**





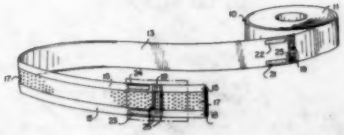
4. A necktie for simulating a windsor knot comprising
a first portion of necktie material,
a second portion of necktie material,
means for fastening said first and second portions together at the neck of a wearer,
a flexible flat strip of material between three and ten inches long and with a maximum width of from three-quarters inch to two inches,
a first fastener secured on said strip near an end thereof,
a second fastener forming a fastener pair with said first fastener secured on said strip,
a third fastener near an end of said strip, and
a fourth fastener forming a fastener pair with said third fastener secured on said strip,
said fourth fastener being offset from the center of the width of the strip,
whereby said flexible flat strip may be arranged around said portions of necktie material in simulation of a windsor knot and secured by joining said second fastener to said first fastener and joining said fourth fastener to said third fastener.

4,958,384
SAFETY GLOVE
David P. McCrane, 1740 Main St., St. Helena, Calif. 94574
Filed Nov. 22, 1988, Ser. No. 274,987
Int. Cl.[5] A41D *19/00*
U.S. Cl. 2—162 **10 Claims**



1. A protective safety glove for use by people engaged in active sports or an industrial job activity to protect against hyperextension of the ligaments and tendons in the wrist, said glove comprising the combination of a glove body having a palm portion joined with a back portion to fit about the person's hand, means forming receptacles for the thumb and fingers of the hand, a substantially inextensible wrist strap for releasably holding the glove body on the person's hand and wrist, said strap having a major axis extending from a first end portion to a second end portion, attachment means for fixedly attaching said first end portion to said glove body along a seam which extends in a direction substantially transverse to said major axis for optimal resistance of tension forces along the major axis when the strap is wrapped around the wrist, said first end portion of the strap overlying substantially the back of said hand with a first width which extends from a region adjacent the wrist of the hand to a region adjacent the knuckles of the hand, with the remaining portion of the strap having a second width less than said first width, the strap having a length along its major axis sufficient to form a wrap about the wrist in the range of substantially one and one-half to three turns as required by the particular sport or job activity.

4,958,385
HAIR DRESSING HEADBAND
Robert C. Rushton, Jr., 739 Barry Dr., Springfield, Pa. 19064
Filed Mar. 27, 1989, Ser. No. 329,275
Int. Cl.[5] A41D *13/00*
U.S. Cl. 2—174 **25 Claims**



1. A headband device for placement about a person's head for absorbing liquids used with hair dressing treatments, comprising:
a fluid impervious barrier layer formed into a strip extending for a distance greater than the circumference of the head, said strip having a width sufficient to define an absorbent holding region and a sealing region;
a moisture pervious fibrous stock sized to cover the absorbent holding region of said strip and having an inside facing region adjacent said absorbent holding region and an outside contact region for contacting the person's head;

an adhesive layer applied to at least one of said absorbent holding region and inside facing region;

a layer of superabsorbent material held in place by said adhesive;

means for bonding said sealing region of said strip at least to said fibrous stock along the length of the strip, to restrict flow of liquids on a person's head to said absorbent region only through said fibrous stock; and

adjustable means for fastening said strip to a person's head to present said fibrous stock in contact therewith.

4,958,386

AEROBIC PANTS

Marc-Henri Louis-Jeune, P.O. Box 501, Allston, Mass. 02134

Filed Jul. 14, 1988, Ser. No. 219,447

Int. Cl.[5] A41D *1/06*

U.S. Cl. 2—227 **9 Claims**

1. Athletic legwear comprising:

a. a pair of pants having an exterior surface,

b. a plurality of pocket assemblies, each pocket assembly having one or more pockets adapted to hold securely therein one or more weights, and

c. means for removably attaching each of said pocket assemblies to said exterior surface of said pair of pants above the knee and below the waist of the wearer.

4,958,387

ADJUSTABLE HINGE ASSEMBLY FOR MOUNTING A SEAT AND/OR COVER TO A SANITARY FIXTURE

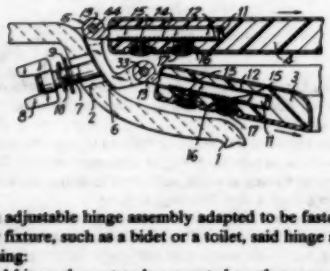
Claudio Fait, Milan, Italy, assignor to American Standard Inc., New York, N.Y.

Filed May 26, 1989, Ser. No. 357,756

Claims priority, application Italy, Jun. 8, 1988, 34852/88[U]

Int. Cl.[5] A47K *3/12*

U.S. Cl. 4—236 **7 Claims**



1. An adjustable hinge assembly adapted to be fastened to a sanitary fixture, such as a bidet or a toilet, said hinge assembly comprising:

a fixed hinge element to be mounted on the upper rear flat region of said fixture, and an articulating hinge element mounted to said fixed hinge element;

said articulating hinge element having an elongated bar, one end of which is pivotally mounted to said fixed hinge, the other end being insertable into a correspondingly shaped well-like chamber formed in a seat and/or cover for said fixture; and

means formed on said elongated bar to cooperate with a latch member adapted to be transversely mounted on said seat and/or cover to releaseably and adjustably fix said articulating member at a desired insertion depth in said well-like chamber so that the front section of the seat and /or cover match the peripheral profile of the front upper rim of said fixture whereby said seat and/or cover can be adjusted with respect to said fixture and can be interchanged with a like seat and/or cover.

4,958,388

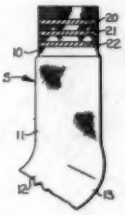
SOCKS WITH SIZE INDICATING STRIPES

James J. Madden, III, Loudonville, N.Y., assignor to Ballston Knitting Company, Inc., Ballston Spa, N.Y.

Filed May 17, 1989, Ser. No. 353,034

Int. Cl.[5] A41B *11/00*

U.S. Cl. 2—239 **5 Claims**



1. Socks each including integrally knit cuff, leg and foot portions, said socks being knit in a variety of sizes and substantially throughout with circular courses of a particular color of yarn, each of said socks including one or more size indicating stripes extending completely around and in a particular location in one of said sock portions, said size indicating stripes being knit in a plurality of the circular courses and of a yarn contrasting in color with said particular color of yarn, and wherein the number of said size indicating stripes of contrasting color yarn constitutes means for indicating and selecting to a prospective customer at the point of sale the size of the particular sock in which said size indicating stripes are knit so that the size of the particular sock is easily recognizable by the number of said size indicating stripes knit in the particular location in one of said sock portions.

4,958,389

PORTABLE/DISPOSABLE SHOWER-BATH

Rawlings H. Hammett, P.O. Box 307, Grandview, Mo. 64030

Filed Feb. 21, 1989, Ser. No. 313,181

Int. Cl.[5] A61H *33/00*; A47K *3/06*

U.S. Cl. 4—547 **2 Claims**

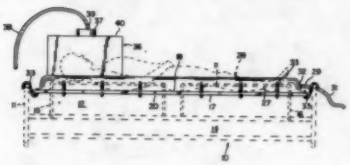
1. A bed covering device adapted for bathing a patient in a hospital type bed having safety rails and a mattress whose top surface is bounded laterally by left and right sides and head and foot extremities, said device comprised of:

(a) a compliant rectangular, waterproof sheet having upper and lower surfaces, a perimeter extending beyond the lateral boundaries of a mattress with which the covering device is interactive, and defined by head and foot extremities and left and right sides,

(b) a number of grommeted apertures evenly spaced about said perimeter,

(c) a splash cuff bonded to said upper surface and extending upright therefrom, said cuff having a perimeter adapted to surround said patient, and accommodating at least one penetrating drain port,

(d) at least one drain hose having a proximal extremity adapted to engage said drain port, and a distal extremity positionable at a convenient disposal site,



(e) multiple securing means having inside and outside extremities, said inside extremities engaging said grommeted apertures, and said outside extremities being adapted to engage said safety rails, and

(f) a removable folding shower hood disposed vertically above said sheet within the perimeter of said splash cuff, said hood being configured to be placed over and surround a patient's head wherein said hood is equipped with means for spraying water upon the head of the patient.

4,958,390

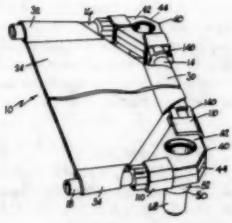
REST COT ASSEMBLY

David L. Mendenhall, Wilsonville, Oreg., assignor to Holbrook-Patterson, Inc., Coldwater, Mich.

Filed Nov. 4, 1988, Ser. No. 267,525

Int. Cl.[5] A47C *19/00*

U.S. Cl. 5—110 **24 Claims**



11. A rest cot comprising:

a substantially rectangular frame comprising a plurality of elongate structural support members secured together;

a flexible support panel suspended from said frame; and

a corner piece positioned at each corner of said frame for securing said structural support member together, said corner piece comprising:

a body portion;

a first attachment section for receiving one of said support members of said cot;

a second attachment section for receiving another of said support members of said cot, said first attachment section being positioned relative to said second attachment section so that a support member received by said first attachment section is perpendicular to a support member received by said second attachment section;

a leg positioned between said first and second attachment sections and extending downwardly from said body portion, said leg comprising a first tubular section extending through said body portion and opening at the top of said body portion, and a second tubular section secured to and extending downwardly form said first tubular section, said second tubular section having a diameter less than that of said first tubular section, said second tubular section of one corner piece being adapted to fit within said first tubular section of another corner piece; and

a wall between said first and second tubular sections of said leg, said wall having at least one orifice therethrough.

4,958,391

SWAY BED SUPPORT FRAME

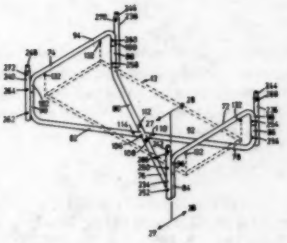
Byron Egeland, General Delivery, Medicine Hat, Alberta, Canada T1A 7E4

Filed Jan. 23, 1989, Ser. No. 299,535

Claims priority, application Canada, May 4, 1988, 565948; Oct. 5, 1988, 579394

Int. Cl.[5] A45F *3/24*

U.S. Cl. 5—127 **9 Claims**



1. A support structure for swaying support of a bed frame, comprising:

four horizontal lower support members (76,78,80,82) extending diagonally inward to a center position;

means (106,108,110,112,114) rigidly connecting inner ends of said lower support members at said center position;

a lower corner member (84,86,88,90) extending upwardly at an outer end of each lower support, integral with the lower support member;

two spaced parallel upper support members (92, 94) each having an integral downwardly extending upper corner member (96,98,100,102) at each end;

means (104) rigidly connecting a lower end of each downwardly extending upper corner member to an upper end of a respective lower corner member;

first, spaced apart, attachment means (132) on each upper support member;

said first attachment means being adapted for attachment of suspension means for a rectangular bed frame.

4,958,392

COMBINATION RECLINING HEADBOARD AND TABLE FOR A BED

Charles L. Cannady, 38 Stokes Rd., Pineville, La. 71360

Filed May 7, 1990, Ser. No. 519,799

Int. Cl.[5] A47C *20/04*

U.S. Cl. 5—507 **7 Claims**

1. A combination reclining headboard and table for a bed having a frame, box spring and mattress comprising:

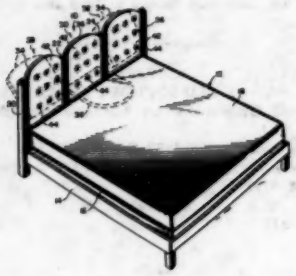
(a) four head posts, spaced apart and secured to the frame at the head, thus dividing it into three sections;

(b) a pair of headboard panels, each sized to fit between two of said head posts at the first and third sections of the head of the frame;

(c) a table panel sized to fit between two of said head posts at the second section of the head of the frame;

(d) means for adjustably moving each of said headboard panels from a vertical position to a rearwardly reclined

position between two of said head posts at the first and third sections of the head of the frame so that a person on the mattress can rest against one of said headboard panels when it is placed in the rearwardly reclined position; and



(e) means for adjustably moving said table panel from a vertical position to a forward horizontal position over the mattress between two of said head posts at the second section of the head of the frame so that a person can place various items on said table panel.

4,958,393

ORTHOPEDIC CRADLE

Arie Brecher, Eilat St. 23, Holon 58310, Israel

Filed Dec. 16, 1985, Ser. No. 809,303
Claims priority, application Israel, Dec. 27, 1984, 73956
Int. Cl.[5] A47C *20/00*
U.S. Cl. 5—431 **19 Claims**

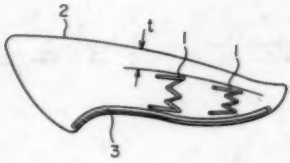
1. An orthopedic cradle for supporting an infant in a horizontal position while aiding in the prevention of hip articulation disorders in the infant, said cradle being of the basket-type and including: a bottom wall for resting on a horizontal surface, a foot wall at the foot end of the cradle, a head wall at the head end of the cradle, and a pair of side walls joined to said bottom, foot and head walls; said foot, head and side walls being of sufficient height to define a compartment for holding the infant, indepently of any other holding means, against falling out when the infant is received therein in a substantially horizontal position with the infant's head adjacent to the head wall and the infant's feet adjacent to the foot wall; characterized in that said cradle further includes a post secured at its lower end to the bottom wall at an intermediate location thereof on its central longitudinal axis, and a transverse bar joined at its mid-portion to the upper end of said post and at its opposite ends to said pair of side walls, said post and transverse bar defining a pair of sockets for receiving the two legs of the infant with the post spreading the two legs apart to force the infant to lie horizontally in a wide open-legged position; said post having a width transversely of the cradle sufficient to spread apart the legs of the infant to an angle of between 60° to 90° with respect to the longitudinal axis of the infant's torso.

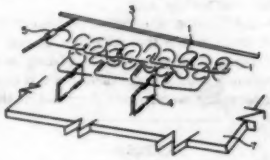
4,958,394

SEAT CUSHION FOR VEHICLE AND METHOD OF MAKING THE SAME

Mancharu Urai, and Hiroshi Suzuki, both of Akishima, Japan, assignors to Tachi-S Co., Ltd., Akishima, Japan

Filed Jun. 11, 1987, Ser. No. 60,412
Int. Cl.[5] A47C *25/00*
U.S. Cl. 5—475 **8 Claims**





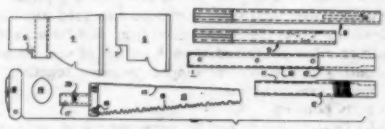
5. A method of making a seat cushion comprising the steps of integrally molding of block of foamed polyurethane in a mold with at least one endless coiled metal spring member formed by coiling a spring metal wire having a small diameter, said spring member being positioned relative to said mold at the location of a seat base portion or each of side portions of said seat cushion by means of spring retainers disposed relative to said mold and in a position relative to each of said at least one spring member so as to retain said at least one spring member at a predetermined distance from the upper surface of said base portion or each of said side portions of said seat cushion.

4,958,395

OUTDOOR CUTTING KIT APPARATUS

Arthur C. Busskohl, 50 G[illegible]eshouse Rd., Newcastle, Wyo. 82701

Filed Sep. 5, 1989, Ser. No. 402,818
Int. Cl.[5] B25F *1/00*
U.S. Cl. 7—145 **5 Claims**



1. A cutting tool assembly for various cutting functions including cutting of wood, animals and other outdoor elements, comprising at least one ax head having a tubular hub having a handle opening to receive a handle projecting from one end of the hub and terminating adjacent the opposite end of the hub, a saw blade having a handle coupling shaft member secured to one end and projecting longitudinally therefrom, said shaft member having a diameter corresponding to the hub opening, a two piece handle assembly including a first head handle having a tubular handle portion of a diameter corresponding to the diameter of said hub opening and a coupling end portion, said coupling end portion and said tubular hub

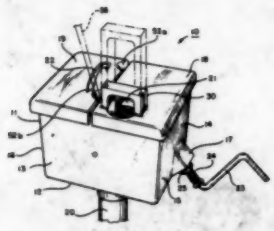
having securement means for releasably connecting said handle to said hub, the outer end of said handle being a tubular member having an opening adapted to telescope onto the shaft member of said saw blade and having securement means for releasable connected to said saw blade whereby said handle unit is adapted for selectively completing the ax and the saw for use, said head opening of said ax having an internal cylindrical opening of a constant diameter and a longitudinally extended tapered keyway extending throughout the total length of said cylindrical opening to prevent outward movement of the head from said handle.

4,958,396

GOLF CLUB AND GOLF BALL CLEANING DEVICE

Thomas L. Butler, 4321 Elmwood Dr., and Albert Stellar, 8501 Twilight Dr. W.3, both of Fort Worth, Tex. 76116

Filed Jun. 26, 1989, Ser. No. 371,626
Int. Cl.[5] A63B *57/00, 47/04;* A46B *13/08*
U.S. Cl. 15—21.2 **1 Claim**



1. A cleaning device for golf clubs and golf balls comprising:

a housing having an open top and first and second lid sections, said first lid section hinged to an edge of said housing opening and covering a first portion of the open top, and said second lid section fixed to said housing and covering a second portion of the open top, said first lid section having opening means to receive a golf club handle when said first lid section is closed, said second lid section having an opening for receiving a golf ball carrier means having a golf ball carried thereby; a brush means rotatably mounted in said housing adjacent to the bottom portion thereof, and means to rotate and induce simultaneous reciprocating movement of said brush means along the longitudinal axis of said means of rotation;

golf club support means mounted in said bottom portion under said first lid section and including means for biasing a golf club toward said brush means; means connecting said first lid section to said biasing means to move said biasing means away from said brush when said first lid section is pivoted open and to permit the biasing means to move toward the brush means when the lid is closed whereby when said first lid section is open a golf club is positioned on said support means and upon closing said lid the biasing means moves said golf club into the path of said rotating brush means to clean said golf club; and a ball carrier means mounted in the opening of said second lid section and positioned to move a golf ball into the path of said rotary brush means to clean said golf ball.

4,958,397

POWER RAIN GUTTER CLEANING TOOL

Timothy J. Ryan, 3201 Carmel Rd., Charlotte, N.C. 28226

Filed Jan. 9, 1989, Ser. No. 294,686
Int. Cl.[5] A47L *25/00;* A46B *13/02*
U.S. Cl. 15—93.1 **6 Claims**

1. A hand held tool for cleaning pine needles and other debris from a rain gutter by an operator standing on the ground said tool comprising:

(A) a handle consisting of a vertical tubular section adapted to fit snugly over a pole, and a horizontal section, cylindrical in shape, in which batteries, battery charger input jack, on/off switch and motor direction switch are nestled into the inner framework of said horizontal section,

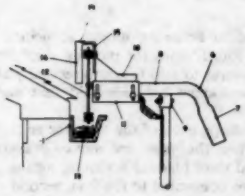
(B) a pole consisting of an upper and lower section joined by a threaded squeeze fit coupling,

(C) a crossarm which is basically tubular in cross section containing a cylindrical connector perpendicular to said crossarm such that said pole can be attached to said connector by means of a thumbscrew and wingnut with said crossarm and pole forming a "T" shape when seen in cross section,

(D) said crossarm at a point near one end bending approximately 70 degrees towards the ground and, a few inches after said bend, being molded from its tubular shape to a flat rectangularly shaped dislodge blade,

(E) said crossarm at the opposite end to said dislodge blade being molded into a housing which contains an electric motor, gears and shafts nestled in the internal framework of said housing,

(F) said housing being rouhgly boxlike in shape with a front panel extending upward above a top panel of said housing approximately 4 inches and with front portions of two side



panels extending upward to form a right triangularly shaped buttress with an upper part of the front panel,

(G) said housing had threaded holes in bottom cornors of the left and right sides to which a roughly "U" shaped sheet of plastic forming bottom and side portions is bolted with such sheet forming a guide and having its bottom portion parallel to the bottom panel of the housing,

(H) a motor shaft extending from said housing and being threaded on its outer surface at its tip and is bored and threaded at this same tip such that a disk can be attached to said shaft,

(I) a disk mounted on said shaft and comprised of a semi-rigid plastic body from which semi-rigid plastic spikes protrude both parallel to and perpendicular to said body,

(J) a guard comprising a half-circle shaped fence section parallel to the disk and a bracket section which in cross section is shaped like a roughly inverted "U" with one leg cut short and a second longer leg attached to the upper part of the front panel of the housing and the shorter leg attaching to the fence section with the top half of the disk fitting between the longer leg and the fence section,

(K) two wires located in the interior of the pole which connect the electric motor and the circuitry in the pole handle.

4,958,398

ROBOT CLEANER FOR USE BETWEEN PARALLEL PLATENS

Charles J. Schmidt, P.O Box 757, Diboll, Tex. 75941

Filed Aug. 7, 1989, Ser. No. 389,912
Int. Cl.[5] B23D *79/02*
U.S. Cl. 15—93.1 **8 Claims**

6. A robot cleaner for insertion between first and second spaced and parallel press platens for cleaning the platens comprising,

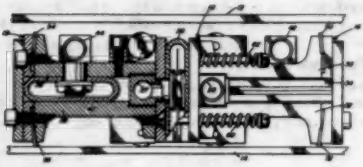
a body having first and second sections connected together but movable relative to each other,

first air bladder actuating means connected between said first and second sections for moving said sections away and toward each other for moving said sections in a direction parallel to said first and second platens when said body is positioned between said first and second platens,

said first section having first and second sides connected together but movable relative to each other,

second air bladder actuating means connected between said first and second sides for moving said first and second sides transverse to said first and second platens when the body is positioned between said first and second platens,

said second section having third and fourth sides connected together but movable relative to each other,



third air bladder actuating means connected between said third and fourth sides for moving said third and fourth sides transverse to said first and second platens when the body is positioned between said first and said second platens,

a scraper blade on each of the sides for engaging one of the platens when the sides are moved transversely by the second and third bladder actuating means, and

control means connected to the first, second and third actuating means for engaging the first and second platens with the blades of one section while engaging the first and second platens with the blades of the other section with a greater force than the blades of the one section, and moving the one section to and across the first and second platens.

4,958,399

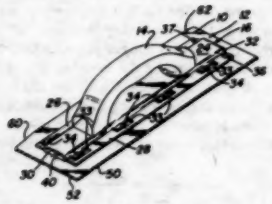
TROWEL ASSEMBLY

Hugh F. Toal, Jackson; Nicholas J. Careyote, Bordentown, both of N.J., and Michael A. Sapienza, Yardley, Pa., assignors to Congoleum Corporation, Lawrenceville, N.J.

Filed Jun. 16, 1989, Ser. No. 367,200

Int. Cl.[5] B05C *11/04, 17/10*

U.S. Cl. 15—104 S **9 Claims**



1. A trowel assembly, comprising a blade and a blade holder having a handle portion and a rail portion securing said handle to said blade, wherein:

said rail is wider than said handle portion but narrower than said blade, and is provided with a two-dimensional array of spring-clip receiving openings;

said blade is of a resilient material and provided with an array of punched-up spring clips congruent with said array of openings whereby said array of springs and said array of clips may be aligned so that said clips extend through said openings, and said blade and rail are slidable relatively to each other along a predetermined direction to cause said clips to grasp said blade and secure it to said rail; and

detent means acting between said blade and said rail to hold said blade against disengagement of said clips from said blade during normal use but releasable by application of a separating force to permit slidable removal of said blade from said rail.

4,958,400

LINE CLEANING APPARATUS

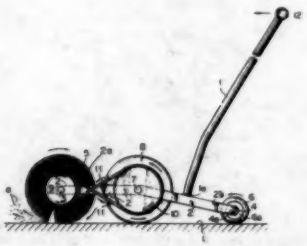
Masahiko Sugita, 8-24, Atago 3-Chome, Niiza-shi, Saitama Prefecture 352, Japan

Filed Sep. 1, 1989, Ser. No. 401,852

Claims priority, application Japan, Jun. 30, 1989, 1-77514[U]

Int. Cl.[5] E01H *1/05*

U.S. Cl. 15—79.1 **2 Claims**



1. An apparatus to be advanced along a boundary line of preset width associated with a playing surface of a game to thereby clean the line, said apparatus comprising:

a frame having (i) a pair of frame members each of which includes a central portion and leading and trailing arm portions which extend in generally opposite directions from said central portion, said leading arm portion having a forwardmost end, and said trailing arm portion having a rearwardmost end, and (ii) a cross brace rigidly connected to and between said pair of frame members so as to laterally separate each said frame member one from the other, wherein said leading arm portions of said pair of frame members are substantially parallel to one another, whereas said trailing arm portions of said frame members converge toward one another;

roller brush means having a brush-mounting shaft for rotatably mounting said roller bursh means transversely between said pair of frame members at said forwardmost end of said leading arm portions thereof for cleaning a boundary line associated with a game's playing surface;

primary and secondary roller means for supporting said frame means for movements over the boundary line to be cleaned, said primary roller means including a roller-mounting shaft for rotatably mounting said primary roller means transversely between said pair of frame members at said central location between said forwardmost and rearwardmost ends thereof, and said secondary roller means being rotatably mounted transversely between said trailing arm portions of said pair of frame members at said rearwardmost end thereof so as to be mounted rearwardly of said primary roller means; and wherein

said roller brush means and said primary roller means each establish an axial dimension corresponding to the preset width of said boundary line, and wherein

said secondary roller brush means establishes an axial dimension which is less than said axial dimension of said roller

brush means said primary roller means, and thus less than the preset width of said boundary line;

said apparatus further comprising pulley means operatively interconnecting said primary roller means and said brush means, said pulley means, during a boundary line-cleaning operation in which said primary roller means is rotatably advanced along a boundary line to be cleaned, for responsively rotating said roller brush means in a rotational direction which causes debris on said boundary line to be brushed forwardly of said roller bush means, whereby said boundary line is cleaned, ansd wherein said pulley means includes;

(a) a pair of pulley wheels fixedly mounted at a respective end of said brush-mounting shaft and said roller mounting shaft so as to be rotatably supported thereby, wherein each said pulley wheel is positioned laterally adjacent to an exterior side of a respective one of said frame members, wherein said respective one of said frame members is located between said pair of pulley wheels, on the one hand, and saidroller brush meansand said primary roller means on the other hand; and

(b) a belt that extends around said pair of pulley wheels, in a configuration such that the belt crosses between the same to form a figure eight.

4,958,401

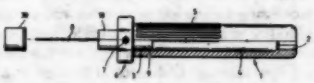
UNIVERSAL TOOL FOR SOLDERING AND DE-SOLDERING APPARATUS

Jurgen Kurz, Weikersheim, Fed. Rep. of Germany, assignor to Cooper Industries, Inc., Houston, Tex.

Filed Aug. 25, 1988, Ser. No. 220,760

Int. Cl.[5] B08B *9/02*

U.S. Cl. 15—104.16 **16 Claims**



1. A universal tool for soldering and de-soldering equipment, comprising:

an elongated hollow handle having axially directed socket openings on either end;

a plurality of cleaning needles; and

a holder for removably mounting said needles to said handle, said holder having:

a plurality of segments constructed and arranged to mount said cleaning needles, wherein each of said segments is adapted for mounting one of said cleaning needles and wherein said segments are rotatable one with respect to the other; and

an insertion piece formable by the rotation of said segments for removable mounting of said holder in one of said axially directed socket openings in said elongated hollow handle.

4,958,402

BRISTLE ARTICLE

Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Wald-Michelbach, Fed. Rep. of Germany

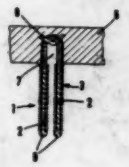
Filed May 19, 1988, Ser. No. 195,794

Claims priority, application Fed. Rep. of Germany, May 23, 1987, 3717475

Int. Cl.[5] A46B *3/00, 15/00*

U.S. Cl. 15—159 A **32 Claims**

1. Bristle article comprising holder means, at least one thermally stabilized stretched plastic monofilament bristle, and flocked short projecting fibers adhesively coated to at least a



portion of an axial length of the at least one thermally stabilized stretched plastic monofilament bristle.

4,958,403

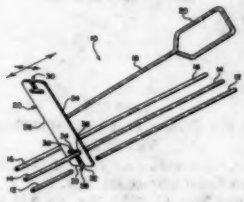
BAR-B-QUE GRILL SCRAPER

LaVerne L. Martin, 438 N. 5 St., Charlton, Iowa 50049

Filed May 17, 1989, Ser. No. 353,043

Int. Cl.[5] A47L *17/06*

U.S. Cl. 15—236.07 **9 Claims**



1. A tool for scraping a grill having a plurality of spaced apart parallel grill rods comprising:

a generally T-shaped implement including an elongated handle and a substantially flat scraper member at one end of said handle disposed transversely to the handle, said scraper member including at least one T-shaped opening including a first slot having an open end centrally along one edge of said scraper member and a first cross slot transversely intersecting said first slot at an end of said first slot opposite said open end of said first slot, the first cross slot extending an equal distance across said first slot and having opposite closed ends substantially conforming to a predetermined grill rod transverse cross sectional shape and size, such that opposite sides of said grill rod can be scraped in each of said opposite closed ends.

4,958,404

CARD FOR PRODUCING FIBROUS WEBS ETC.

Werner Lasenga, Duelmen, Fed. Rep. of Germany, assignor to Hergeth Hollingsworth GmbH, Duelmen, Fed. Rep. of Germany

Filed Sep. 30, 1988, Ser. No. 252,335

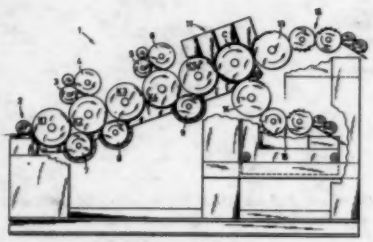
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1987, 3734313

Int. Cl.[5] D01G *15/74, 15/28*

U.S. Cl. 19—98 **6 Claims**

1. A textile card for producing fibrous webs and random webs of textile fibers comprising a series of cylinders fitted with metallic wire which rotate relative to each other in a predetermined sense, and a plurality of worker rollers coordinated with said cylinders, a fiber intake and, at least one take-off roller, said worker rollers including a trough shaped cover which includes trough-shaped plates, and said cover containing an opening for regulating the air current between said rollers and said cover, characterized in that said trough-shaped

cover of said worker rollers is formed of a plurality of trough sections arranged in spaced series relationship, and means for



opening said trough sections to provide a desired air flow around said cylinder and rollers.

4,958,405

WIPER DEVICE FOR A CURVED WINDSHIELD OF A VEHICLE

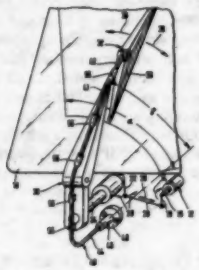
Gerd Kühbauch, Bühlertal, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 353,073

Claims priority, application Fed. Rep. of Germany, Jul. 20, 1988, 3824489

Int. Cl.[5] B60S *1/44*

U.S. Cl. 15—250.33 **5 Claims**



1. A wiper device for a windshield of a vehicle, said wiper device comprising an oscillating wiper arm having a free end; a wiping blade connected with said wiper arm at said free end of said wiper arm and pivotable about a pivot axis as a result of an oscillating movement of said wiper arm, said pivot axis being spaced from the windshield and extending substantially parallel thereto; and an elongate flexible member fixed at one end thereof and having at the other end thereof a pivot shaft defining said pivot axis and displaceable with said wiper arm and connected with said wiping blade for transforming the oscillating movement (α) of said wiper arm into a pivotal movement of said wiper blade, said one end and said pivot axis defining first and second longitudinal axes, respectively, said pivot axis forming an angle (γ) with said first axis less than 180°.

4,958,406

METHOD AND APPARATUS FOR OPERATING VACUUM CLEANER

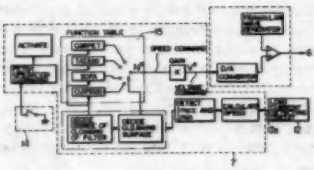
Hisanori Toyoshima; Fumio Jyoraku; Yoshitaro Ishii; Kazuo Tahara, all of Hitachi; Haruo Koharagi; Syuji Watanabe, both of Ibaraki; Koaichi Saito, Kitaibaraki; Kunio Miyashita, Hitachi; Tsuchiro Endo, Hitachiota, and Wakichiro Hishi, Nagareyama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 14, 1988, Ser. No. 284,382

Claims priority, application Japan, Dec. 15, 1987, 62-316885; Mar. 7, 1988, 63-51488

Int. Cl.[5] A47L *9/28*

U.S. Cl. 15—319 **10 Claims**



8. A vacuum cleaner comprising:

an electric blower for collecting dust in a dust chamber through a suction port, said electric blower creating a suction pressure;

blower control means for controlling a rotational speed of said electric blower;

control rule generating means for generating a plurality of control rules for controlling the operation of said vacuum cleaner;

means for selecting one of said plurality of control rules generated by said control rule generating means; and

signal processing means for processing said selected one of said plurality of operation control rules and for outputting a control signal to said blower control means so as to control operation of said electric blower in accordance with said selected control rule.

4,958,407

AUXILIARY TOOL HANDLE

Samuel V. Johnson, 32 Cherry Tree Rd., Loudonville, N.Y. 12211

Continuation-in-part of Ser. No. 200,451, May 31, 1988. This application Aug. 21, 1989, Ser. No. 396,549

Int. Cl.[5] B25G *1/00*

U.S. Cl. 16—114 R **20 Claims**

1. An auxiliary tool handle for attaching to an elongated tool handle comprising:

a plurality of loop shaped member sized to receive at least 4 of a user's fingers

said members having a first end and a second end, said ends being capable of adjoining the elongated tool handle,

a handle attachment means at each of said ends capable of releasably securing each of said members to the elongated tool handle,

said first and second ends of each of said members extending substantially parallel to the elongated tool handle when said member is attached to said handle

said first end extending away from an area bounded by the perimeter of said member and

said second end extending to form a lower boundary for said area bounded by the perimeter of said member.

4,958,408

DEVICE FOR REMOVING THE CRAW OF SLAUGHTERED POULTRY

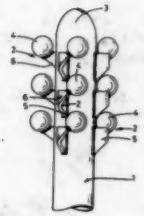
Cornelis Meyn, Haal 62, 1511 As Oostzaan, Netherlands

Filed Jul. 10, 1989, Ser. No. 377,899

Claims priority, application Netherlands, Aug. 8, 1988, 8801970

Int. Cl.[5] A22C *21/00*

U.S. Cl. 17—11 **20 Claims**



1. Device for removing the craw of slaughtered poultry, especially turkeys, comprising a rotatable mandrel adapted to be moved via the opening in the belly through the neck of the poultry and projections positioned thereon extending in the direction of rotation and the direction of motion of the mandrel, characterized in that each projection is provided with a blunt outer end defining the outer limitation of the device.

4,958,409

METHOD AND APPARATUS FOR TURNING OVER AND STRETCHING FISH FILLETS

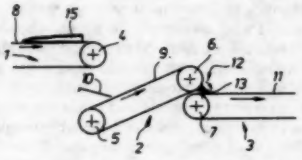
Horst K. H. Braeger, and Hugo Pontow, both of Lübeck, Fed. Rep. of Germany, assignors to Nordischer Maschinenbau Rud. Baader GmbH & Co., Lubeck, Fed. Rep. of Germany

Filed Nov. 7, 1989, Ser. No. 433,023

Claims priority, application Fed. Rep. of Germany, Nov. 10, 1988, 3838154

Int. Cl.[5] A22B *5/00*

U.S. Cl. 17—24 **11 Claims**



1. A method for the automatic turning over of fish fillets defining a longitudinal axis, with each fillet being conveyed lying in a flat position and in the direction of its longitudinal axis and being transferred to a lower-lying, actively conveying plane, wherein each fillet

(a) is deflected into a substantially vertical position whilst a turnover moment is imparted thereon,

(b) is brought into a free fall, and

(c) is then caught at its leading end and conveyed-on accompanied by engagement on the part following said leading end of the fillet.

4,958,410

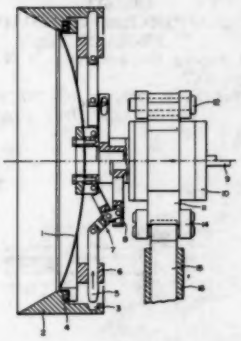
MACHINE FOR MEAT TREATMENT AND MACERATION WITH AUTOMATIC LOADING AND UNLOADING

Narciso C. Lagares, Bessis, Spain, assignor to Metalquima, S.A., Gerona, Spain

Filed Mar. 22, 1989, Ser. No. 327,268

Int. Cl.[5] A22C *9/00*

U.S. Cl. 17—25 **3 Claims**



1. In a machine for meat treatment and maceration with automatic loading and unloading having a frame, a drum rotatably mounted on its symmetry axis on the frame, an internal chamber in the drum, and a loading and unloading hood inlet opening defined in one end of the internal chamber, a closing door-lid engaging against said loading and unloading hood inlet, a supporting structure on the frame and independent of the drum for supporting the closing door-lid, means for rotatably supporting the closing door-lid on said supporting structure, means for positioning said closing door-lid in said drum inlet and for separating said closing door-lid therefrom, and driving assembly means for fitting and locking said door-lid in tight closing engagement in the drum hood inlet in any position of rotation, the improvement comprising:

means on said supporting structure assembly for releasably gripping said driving assembly means so that said driving assembly means is released and said door-lid is freely rotatable on said supporting structure when said door-lid is fitted and locked to said hood inlet to allow rotation of the door-lid with the drum, and said driving assembly means is locked on said supporting structure during opening and closing of said hood-inlet by said door-lid for loading and unloading of the drum.

4,958,411

DUAL TUBE STUFFING HORN WITH EXPANDING SPRING FOR SIZE CONTROL

Thomas R. Stanley, Kansas City, Mo., assignor to Teepak, Inc., Westchester, Ill.

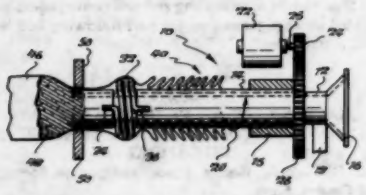
Filed Dec. 11, 1989, Ser. No. 448,793

Int. Cl.[5] A22C *11/02*

U.S. Cl. 17—41 **13 Claims**

1. A filling horn for a food stuffing apparatus, which comprises an inner tubular body, an outer tubular body at least in-part coaxially mounted on said inner tubular buoy, at least

one of said tubular bodies being movable relative to the other, and a spring member circumferentially coiled around at least



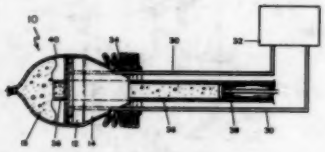
one of said tubular bodies and adapted to expand radially upon movement of one of said tubular bodies.

4,958,412

METHOD AND APPARATUS FOR COATING A FOOD PRODUCT

Tom G. Stanek, Smyrna, Ga., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Dec. 9, 1988, Ser. No. 282,794
Int. Cl.[5] A22C *11/02*
U.S. Cl. 17—41 **15 Claims**



1. In a sizing ring suitable for use with a tubular casing and a stuffing horn, the sizing ring comprising a cylindrical sleeve having

(i) an outer diameter substantially corresponding to the inside diameter of the casing ,

(ii) an inner diameter slightly greater than the outside diameter of the stuffing horn, and

(iii) two parallel, lateral faces defining the lateral thickness of the sleeve, the improvement comprising:

(a) at least one channel within the sleeve, said channel having a first end and a second end, the first end terminating in an orifice at one of the lateral faces of the sleeve; and

(b) an annular groove located at an outer extremity of the sleeve, in communication with the second end of the channel, and intermediate the lateral faces of the sleeve.

4,958,413

DRIVE MECHANISM FOR A FEED ROLL OF A COMBING MACHINE

Heinz Clement, Winterthur, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

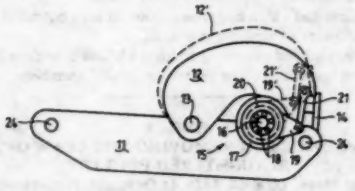
Filed Dec. 16, 1988, Ser. No. 285,215
Claims priority, application Switzerland, Dec. 24, 1987, 5059/87
Int. Cl.[5] D01G *19/18*
U.S. Cl. 19—115 R **7 Claims**

1. A drive mechanism for a feed roll of a combing machine, said mechanism comprising

at least one pivotally mounted arm movable between a raised position and a lowered position and adapted to carry a top nipper thereon;

a freewheel having an inner member adapted to be secured to a feed roll for rotation thereof, an outer member concentric to and rotatable about said inner member and a plurality of locking elements between said members, said elements being movable in response to rotation of said outer member to move between one of a release position allowing free rotation of said outer member relative to said inner member and a locking position locking said members together; and

means connecting said outer member to said arm for rotation



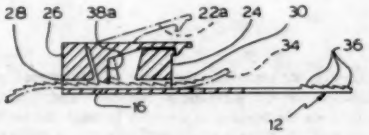
of said outer member in response to movement of said arm between said positions thereof, said means including a lug secured to and extending from said outer member and a link pivotally connected between and to said lug and said arm.

4,958,414

REUSABLE TIE-ALL OR BUNDLE FASTENER

Edward J. Benoit, 28 Guérin Street, Boucherville, Canada J4B 1Z7

Filed Dec. 5, 1989, Ser. No. 446,299
Int. Cl.[5] B65D *63/00*
U.S. Cl. 24—16 PB **4 Claims**



1. A strap fastener for retaining and supporting a bundle of elongated elements, comprising:

an elongated semi-flexible, elastic strap member defining a top wall, a bottom wall, two side edges, and first and second opposite end sections, the top wall of said strap member defining a first end section in register with said strap first end section and having a series of successively spaced, transverse serrations or grooves;

a casing, extending outwardly from and anchored to a second end section of said strap member top wall opposite said first end section, and defining a through-channel adjacent said strap member top wall and substantially parallel thereto and forming a first free end mouth and a second opposite mouth;

said strap member first end section constituting a free end section releasably engaged through said first mouth, into said channel, and escapingly through said second mouth so that said strap member forms a loop wherein said bundle of elements are destined to engage through said loop;

said casing defining a first free end section and an opposite second end section, two side walls transversely integral to said strap member wherein said channel extends therebetween; an elongated, semi-flexible, elastic tongue, defining a first end section, integral to said casing side walls about said casing first end section, and an opposite second free end section or lip, movable away from or towards said channel hingedly about said tongue first end section; said tongue being prebiased to a position substantially parallel to said channel, wherein the tongue is laterally shielded by said casing side walls therebetween;

said lip extending beyond the level of said second mouth, for

clearing said casing side walls and thus facilitating manual handling thereof;

a tooth, depending from an intermediate section of said tongue and directed toward said channel but extending short of said strap member top wall, said tooth defining a free end edge extending partially into said channel and matingly releasably engaged with a selected registering one of said strap serrations; said interengaged tooth free end edge and strap serration being of such a shape as to retain said strap member first end section into said channel against the unlooping bias from the looped said semi-flexible elastic strap member, once the latter has been pulled tightly around said bundle of elements;

wherein release of said tooth from said selected strap serration is possible only upon pivotal motion of said tongue lip away from said channel;

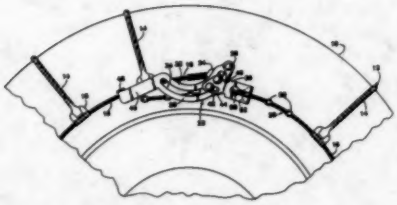
and further including releasable snap lock means, to prevent pivotal motion of said tongue lip away from said channel.

4,958,415

CONNECTOR FOR LATERAL CABLE OF TIRE CHAINS

Eric Johnson, Vancouver, Wash., assignor to Quality Chain Corp., Portland, Oreg.

Filed Jun. 7, 1989, Ser. No. 363,624
Int. Cl.[5] A44B *21/00*; B60C *27/10*
U.S. Cl. 24—69 TT **12 Claims**



1. Connecting apparatus for interconnecting the opposite ends of a lateral cable of a set of tire chains comprising:

(a) anchor means fixedly attached to said lateral cable proximate a tail end portion thereof;

(b) tensioning lever means pivotally interconnected with a head end portion of said lateral cable and free to rotate from a releasing position in which said lever means extends away from said head end portion of said lateral cable to a tensioning position in which said lever means extends generally alongside said head end portion of said lateral cable;

(c) means defining an arcuate cam associated with said tensioning lever means said cam including a cam slot; and

(d) clasp means for engaging said anchor means, said clasp means being attached to said lever means in engagement with said cam slot and being free to follow said arcuate cam by movement along said cam slot in response to application of tension to said clasp means by said tail end portion of said lateral cable.

4,958,416

SHOULDER HARNESS STRAP ADJUSTER AND COMFORT CLIP

Dan Frishling, 355 Doulin La., Newbury Park, Calif. 91320

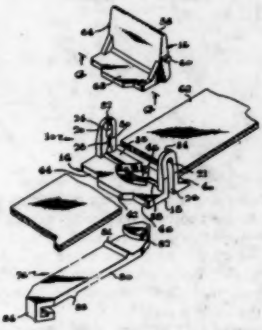
Filed Jun. 29, 1989, Ser. No. 374,085
Int. Cl.[5] A44B *11/25*
U.S. Cl. 24—170 **7 Claims**

1. A shoulder harness strap and adjuster comprising:

a first comfort clip for attachment to the shoulder harness strap of an automotive seat belt assembly at a point adjacent the user's shoulder;

a second comfort clip for attachment to the lap belt strap of an automotive seat belt assembly at a point adjacent the hip of the user;

at least one of said comfort clips comprising a base together with first and second arms extending upward from said base, said arms spaced sufficiently apart to receive therebetween the corresponding strap, together with a latch mounted on said arms and cooperating with said base so that, in a latched position, the strap is clamped between said latch and said base and, in an unlatched position, aid comfort clip is free to move with respect to the strap, said arms having slots therein extending through said base and



upward through said arms to define a pivot pin receptacle, and pivot pins on said latch to be received in said receptacle so that said latch can pivot with respect to said base and said arms; and

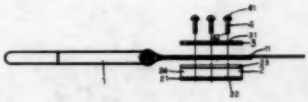
a rod interconnecting said first and second comfort clips to limit the distance between said comfort clips so that said first comfort clip holds the shoulder harness strap over the shoulder of the user, an arcuate slot in said base and a connector body on said rod for engagement in said slot so as to permit limited angular motion between said base and said rod to aid in alignment.

4,958,417

ATTACHMENT DEVICE FOR STRAP END

An C. Chou, No. 212, Yung-An St., Tainan, Taiwan

Filed Mar. 28, 1990, Ser. No. 500,183
Int. Cl.[5] A44C *5/18*; F16B *1/00*
U.S. Cl. 24—265 R **1 Claim**



1. An attachment device for strap end comprising:

an elongated clamp member made of deformable material and having a flat bottom formed with a plurality of openings and opposed arcuate side walls defining a space therebetween;

a securing piece having a plate body formed with a plurality of openings and dimensioned to be located in the space defined in the clamp member over the flat bottom of the clamp member to define a passageway along a longitudinal direction between the securing piece and clamp member for extension of an overlapped section of a strap with openings of the securing piece corresponding the openings of the clamp member; and

a plurality of rivets for insertions through corresponding openings of the securing piece and clamp member, each

having a flattening top end and a bottom end shaped to pierce the overlapped section of the strap and being flattened under the flat bottom of the clamp member through a pressing operation.

4,958,418

LACE TIGHTENING APPARATUS

Pierre Dufour, Menthon-St-Bernard, France, assignor to Salomon S.A., Annecy, France

Filed Jun. 19, 1989, Ser. No. 367,748
Claims priority, application France, Jun. 23, 1988, 88 08460
Int. Cl.[5] A43B *11/00*
U.S. Cl. 24—713.6 **24 Claims**

1. A lace tightening apparatus for tightening two opposite portions against one another comprising:

at least one eyelet mounted on each of said two opposite portions which are to be traversed by a lace, the two opposite eyelets being positioned substantially in a single lacing plane that also contains the lace which passes through the eyelets; and

each said eyelet being inclined with respect to said lacing plane at an angle such that the lace is in contact with each said eyelet only at two opposite points which are spaced from one another in the longitudinal direction of the lace, each of said opposite points being a tangent point between a surface of said lace and a surface of said eyelet.

4,958,419

DUAL LOOP HOSE CLAMP

John E. Heckethorn, Dyersburg, and Danny J. Whittle, Newbern, both of Tenn., assignors to 3900 Corp., Baltimore, Md.

Continuation of Ser. No. 581,122, Feb. 17, 1984, abandoned. This application Feb. 14, 1986, Ser. No. 829,224
Int. Cl.[5] A44B *1/04*
U.S. Cl. 24—283 **9 Claims**

1. A low profile hose clamp comprising:

(a) a single length of wire curved upon itself to form a pair of laterally spaced hose encircling loops, and comprising the following portions, in sequence:

(1) a first unattached end portion;

(2) a first transition portion;

(3) a first loop portion;

(4) a connecting portion bent to define a coiled, screw-receiving nut section of approximately one and one-half turns, and having a longitudinal axis;

(5) a second loop portion laterally spaced from said first loop portion;

(6) a second transition portion; and

(7) a second unattached end portion; said transition portions and said loop portions being in close overlapping association;

(b) an actuating plate having at least two spaced holes therein in a plane normal to the longitudinal axis of said nut section, each of said unattached end portions being bent backwardly toward said nut section and received within one of said holes in the actuating plate; and

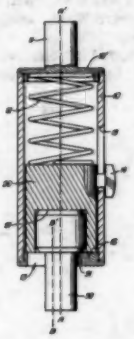
(c) a large diameter actuating screw having shallow, widely spaced flat-bottom threads, said screw passing through and in threaded engagement with said nut section, one end of said screw engaging against said actuating plate between the holes therein.

4,958,420

PLUG-TYPE CLASP FOR PIECES OF JEWELRY

Georg Bunz, Obere Bergstr. 16, D-7544 Dobel, Fed. Rep. of Germany

Filed Jan. 30, 1990, Ser. No. 472,026
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1989, 3903342
Int. Cl.[5] A44C *11/00*; F16B *1/00*
U.S. Cl. 24—653 **8 Claims**



1. A plug-type clasp for securing together the ends of a piece of jewelry, said clasp comprising: a housing having a central longitudinal axis and a front end and a rear end, said ends being spaced apart along the central longitudinal axis of said housing; a sleeve installed in said housing for movement in the direction of the central longitudinal axis of said housing, said sleeve having a front end which faces said front end of said housing, and said sleeve being provided with a receiving opening which extends from said front end of said sleeve and which has a central longitudinal axis that lies parallel to the central longitudinal axis of said housing; spring means disposed in said housing and acting on said sleeve for urging said sleeve toward said front end of said housing; cover means disposed at said front end of said housing and defining a passage opening having a central longitudinal axis which is laterally offset from the central longitudinal axis of said receiving opening; and connecting means including a connecting part, said connecting part being configured to be capable of passing through said passage opening when said connecting part has a first position and to be capable of passing into said receiving opening when said connecting part has a second position, the first and second positions being offset transverse to the central longitudinal axis of said housing by a distance such that when said connecting part is in the first position it is prevented from entering said receiving opening and when said connecting part is in the second position it is prevented by said cover means from passing through said passage opening, wherein said sleeve is displaceable along the longitudinal axis of said housing, against the urging of said spring means, between a locking position for holding said connecting part in said receiving opening and a release position for permitting said connecting part to move to its second position for passage through said passage opening.

4,958,421

METHOD FOR ASSEMBLING A VENETIAN BLIND

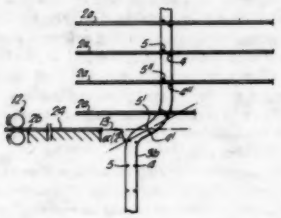
Robbert E. Spangenberg, Oosterhout, Netherlands, assignor to Hunter Douglas International N.V., Curacao, Netherlands Antilles

Filed Nov. 22, 1988, Ser. No. 274,519

Claims priority, application Netherlands, Dec. 2, 1987, 8702890

Int. Cl.[5] B23P *19/04*

U.S. Cl. 29—24.5 5 Claims



1. A method for interlacing a plurality of slats with a plurality of ladder means to form a venetian blind, each slat having a given width and a given depth, defining a cross section, the ladder means comprising a pair of horizontally spaced, parallel, longitudinally extending side members, the side members being in the form of tapes, and a plurality of longitudinally spaced cross connections, one cross connection being provided for each slat, each cross connection including at least a first and a second cross element, the first cross element being spaced from the second cross element along the width of the tape side members, the mutual spacing between the cross elements of any given cross connection, as measured in the plane joining the longitudinal axes of the cross elements, being greater than the given depth of a slat, wherein the height of the projection of every pair of first and second cross elements on a plane through the longitudinal axes of the side members ranges between zero and slightly greater than the given depth of the slats and the distance between the side members of the ladder means is slightly greater than the given width of the slats, the interlacing of each slat comprising the steps of:

(a) supplying a slat along a feed path perpendicular to the cross section of the slat;

(b) providing at least two said ladder means, wherein the mutual spacing between the cross elements of each ladder means defines an interlacing opening;

(c) intermittently moving the side members longitudinally and stepwise in a laterally stretched condition to sequentially position consecutive cross connections at a location of interlacing, at which the slat enters the interlacing opening;

(d) guiding the side members so that, at least at the interlacing location, the side members of each ladder means are each positioned so that the longitudinal axis of each side member forms an acute angle with the longitudinal axis of the feed path, such that the projection of the interlacing opening on a plane perpendicular to the longitudinal axis of the feed path is larger than the cross section of the slat; and

(e) feeding the slat through the interlacing opening.

4,958,422

WEAR-RESISTANT COMPOUND ROLL

Masahiko Oshima; Takumi Ohata, and Toshiyuki Hatori, all of Kitakyutsyu, Japan, assignors to 501 Hitachi Metals, Ltd., Japan

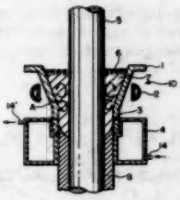
PCT No. PCT/JP88/00304, § 371 Date Nov. 22, 1988, § 102(e) Date Nov. 22, 1988, PCT Pub. No. WO88/07594, PCT Pub. Date Oct. 6, 1988

PCT Filed Mar. 24, 1988, Ser. No. 320,644

Claims priority, application Japan, Mar. 24, 1987, 62-69666

Int. Cl.[5] B21B *31/08*

U.S. Cl. 29—129.5 8 Claims



1. A wear-resistant compound roll comprising a steel core shaft having a tensile strength of 55 kg/mm^2 or more and an elongation of 1.0% or more, and an outer layer on said sheet having a surface with a Shore hardness of 70 or more and made of an iron-base alloy having a composition consisting essentially, by weight, of 1.5–3.5%, C, 0.3–3.0% Si, 0.3–1.5% Mn, 2–7% Cr, 9% or less Mo, 20% or less W, 3–15% V and balance substantially Fe; said outer layer being metallurgically bonded to said steel shaft by a shell casting method comprising using a composite mold comprising a refractory mold and a cooling mold provided under said refractory mold, supplying a melt of said iron-base alloy around said steel shaft in said refractory mold, keeping said melt in said refractory mold while heating and stirring it by an induction coil at a temperature in the range between a first temperature at which primary crystals are precipitated from said melt and a second temperature up to 100° C. higher than said first temperature, moving said steel shaft downwardly concentrically with said composite mold, thereby solidifying said melt by contact with said cooling mold and bonding solidified melt to said steel shaft; and a boundary layer between said outer layer and said shaft, said boundary layer having a tensile strength at least as high as that of the weaker of said outer layer and said shaft.

4,958,423

WATER-SUPPLYING CORD AND A TOOL FOR INSERTING A HOSE IN IT

Hidenobu Mori, Tokyo, Japan, assignor to Onoda Electric Co., Ltd., Tokyo, Japan

Division of Ser. No. 192,811, May 11, 1988. This application Aug. 24, 1989, Ser. No. 398,198

Claims priority, application Japan, Oct. 2, 1987, 62-152110; Dec. 31, 1987, 62-200773

Int. Cl.[5] B23P *19/02*

U.S. Cl. 29—235 5 Claims

1. A hose insertion tool adapted to be used for inserting an elongated element within a passageway of a tube having a resiliently closed rift leading to said passageway, said hose insertion tool comprising: an elongated tool body having a longitudinal axis, said body having one longitudinal end with a passage which opens up onto said one longitudinal end and which extends longitudinally into said body, said body having an outer wall extending longitudinally from said one longitudinal end, a groove in said body between one side of said outer wall and said passage, a guide channel in said body between an opposite side of said outer wall and said passage, said guide channel having a channel axis extending at an acute angle

relative to said longitudinal axis, said one longitudinal end of said body being insertable in said rift by temporarily separating

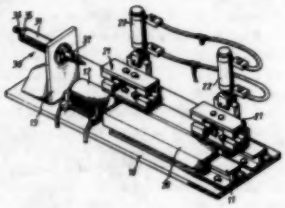
said rift and moving said tool body along said rift while simultaneously feeding said elongated element through said guide channel into said passageway of said tube.

4,958,424

DEVICE FOR FITTING A HOSEL ON A CLUB SHAFT

Paul K. H. Hsu, 1 Fl., No. 1-2, Lane 30, Sec. 2, Hsing Sheng S. Rd., Taipei, Taiwan

Filed Oct. 26, 1989, Ser. No. 426,981
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—252 **1 Claim**



1. A device for fitting a hosel on a club shaft, comprising:

a base;

two rails being parallel to each other and mounted on said base;

a holder seat having a flat upper surface being engaged with said two rails and being slidable on said two rails along a length of said rails;

a horizontal pneumatic cylinder being mounted on said base at a first end of said two rails and in alignment with a middle portion of said base, said horizontal pneumatic cylinder having a piston with an exposed end connected to said holder seat, said holder seat being actuated by said horizontal pneumatic cylinder to slide on said two rails along the length of said rails via said piston;

two holders being parallel to each other and provided above said holder seat for holding a club shaft, each of said two holders consisting of a fixed lower part mounted on said flat upper surface of said holder seat and a movable upper part actuated by two corresponding vertical pneumatic cylinders to move in a vertical orientation; said two movable upper parts mating with corresponding said fixed lower parts to hold the club shaft during the fitting of a hosel on said club shaft;

a vertical plate being mounted on said base adjacent a first end of said horizontal pneumatic cylinder, said vertical plate having a hole with its center positioned in alignment with a longitudinal axis of said club shat placed on said two lower parts of said two holders;

an assembling cylinder being fixed onto said vertical wall with a second end inserted in said hole, said assembling cylinder being substantially a hollow cylinder having a casing and a first end as well as said second end, said first end of said assembling cylinder being sealed by a cap, said cap having an inner threaded hole for a positioning screw to pass therethrough, said positioning screw penetrating into an interior of said assembling cylinder and thereby defining an inserted portion of said positioning screw and being lengthwise movable within said assembling cylinder, a fastening nut being provided on an outer side of said cap to fix said positioning screw and determine a position of said positioning screw;

said assembling cylinder further having a flange formed on a periphery of said second end thereof, said assembling cylinder being fixed onto said vertical plate via said flange by screws, said assembling cylinder having a rod slidably received therein, said rod comprising a block having a first side and a second side, a first projection protruding from said first side of said block and a second projection protruding from said second side of said block, said first projection having an outside diameter smaller than an inside diameter of said assembling cylinder, a return spring being provided between said first end of said block and an inner wall of said cap wherein said first projection and said inserted portion of said positioning screw are accommodated in said return spring, a third projection protruding from said second projection and forming a shoulder portion therebetween;

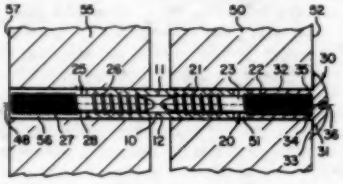
said second projection having an outside diameter the same as a diameter of a narrower end of said hosel, said rod being partially restrained in said assembling cylinder by a thrust cap, said thrust cap being fixed to said flange by screws, a recess having a corresponding shape to a larger end of said hosel being centrally formed on said thrust cap at a first side thereof for a larger end of said hosel to abut therein, a bore being centrally formed in said recess and having a diameter the same as an outside diameter of said second projection, said third projection having a tapering portion to pass through said hosel and said club shaft such that said hosel and said club shaft respectively cover said second projection and said third projection, said rod being restrained in said assembling cylinder such that said second side of said block abuts an inner surface of said thrust cap and said return spring is neuturally positioned between said first side of said block and said inner wall of said cap, said return spring being pressed in response to a horizontal movement of said holder seat actuated by said horizontal pneumatic cylinder till said first projection is stopped by said inserted portion during the fitting of said hosel on said club shaft, said return spring pushing said rod back to its original position after the fitting of said hosel on said club shaft.

4,958,425

KNOCK-DOWN FURNITURE COUPLING DEVICE

Daniel Gomes, P.O. Box 117, Worcester, N.Y. 12197

Division of Ser. No. 888,763, Jul. 22, 1986, Pat. No. 4,743,068.
This application May 10, 1988, Ser. No. 191,897
Int. Cl.[5] B23P *19/04*
U.S. Cl. 29—433 **6 Claims**



1. An assembly for coupling a plurality of pieces, comprising:

an aligned bore extending through each of said plurality of

pieces, said plurality of pieces comprising at least a first end piece and a second end piece:

an axially stretchable tube made from an elastomeric material, said tube having an interior surface at least partially therethrough, passing through said aligned bore; and

means for removably securing said stretchable tube to, an in axial tension between, each of said first and second end pieces, thereby holding each of said pieces in a fixed longitudinal relationship, while permitting relative rotation between each of the said plurality of pieces.

4,958,426

FUSE TERMINAL MANUFACTURING METHOD

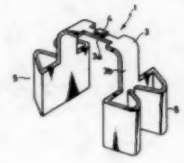
Takayoshi Endo, and Yuuji Hatagishi, both of Shizuoka, Japan, assignors to Yazaki Corporation, Japan

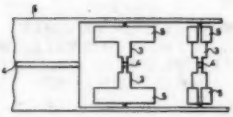
Division of Ser. No. 238,670, Aug. 31, 1988, abandoned. This application Oct. 20, 1989, Ser. No. 424,610

Claims priority, application Japan, Sep. 1, 1987, 62-216298

Int. Cl.[5] H01H *69/02*

U.S. Cl. 29—623 **3 Claims**





1. A method of manufacturing a fuse terminal formed with a pair of opposing contact portions and a fused portion connected between the opposing contact portions, which comprises the steps of:

(a) fixing low fusing point metal material at a middle portion of a fusible conductor sheet material along a longitudinal direction thereof;

(b) punching the fusible conductor sheet material provided with the low fusing point metal material into a development shape of the fuse terminal in such a way that the low fusing point material is located at the fused portion of the fuse terminal;

(c) bending the punched fusible conductor sheet material into a fuse terminal shape; and

(d) cutting off the punched and bent fusible conductor from the sheet material.

4,958,427

TELEPHONE WIRE TERMINATION BLADE STORAGE COMPARTMENT

Terry L. Smith, Westlake Village, and William D. Krietzman, Lancaster, both of Calif., assignors to Harris Corporation, Melbourne, Fla.

Filed Jul. 26, 1988, Ser. No. 224,382

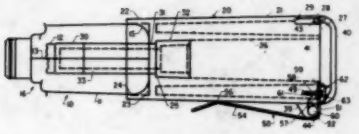
Int. Cl.[5] H01R *43/00*

U.S. Cl. 27—566.4 **16 Claims**

1. For use with a blade termination tool having a handle with an accessible internal bore, a blade storage device attachable to said tool comprising:

a housing having at least one closable compartment of a size and shape for storing therein a plurality of blades upon which said tool operates; and

means, coupled with said housing, for attaching said housing to said tool by way of the externally accessible internal bore of said handle, and wherein said housing contains a plurality of compartments extending in parallel with one another in the direction of the longitudinal direction of said handle, and wherein said attaching means is accessible by way of one of said compartments, and wherein said



attaching means comprises a pin having a head portion engageable with said one of said compartments and a shank extending externally of said housing and being sized and of a length to be inserted in the internal bore of said handle.

4,958,428

PROCESS AND AN ARRANGEMENT FOR PRODUCING A SUPPORTING BODY FOR A CATALYTIC REACTOR

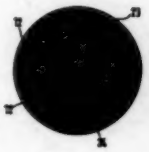
Bohumil Humpolik, Ludwigsburg, Fed. Rep. of Germany, assignor to Süddeutsche Kühlerfabrik Julius Fr. Behr GmbH & Co. KG, Fed. Rep. of Germany

Continuation of Ser. No. 264,018, Oct. 28, 1988, abandoned. This application Oct. 30, 1989, Ser. No. 430,897

Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738537

Int. Cl.[5] B21D *53/00*

U.S. Cl. 29—890 **22 Claims**



1. A process for producing a supporting body for a catalytic reactor for purifying exhaust gas, particularly of internal-combustion engines in motor vehicles, comprising at least one of winding or folding at least one of corrugated or corrugated-and-smooth metal strips to form adjacent layers, fastening said layers in a casing tube, and providing slots extending transversely to the longitudinal direction of said strips, wherein the slots are first made in the form of incisions directly in the metal strips without removing material, and wherein the metal strips are only then subsequently wound up or folded to the final shape and are then slid into the casing tube, said slots allowing expansion of said layers.

4,958,429

METHOD OF MAKING LOW PROFILE LAMP SOCKET ASSEMBLY

John A. Forish, Fort Wayne, and John J. Rogers, Huntertown, both of Ind., assignors to Zaxxx, Inc., Avilla, Ind.

Division of Ser. No. 352,965, May 17, 1989. This application Jul. 20, 1989, Ser. No. 383,163

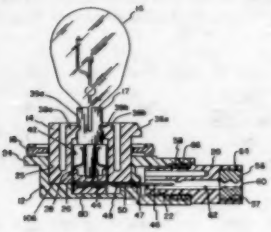
Int. Cl.[5] H01R *33/09*

U.S. Cl. 29—877 **13 Claims**

1. A method of making a lamp socket assembly comprising:

providing a housing having a cavity therein, said cavity defining an end wall of said housing, a body member means for holding a bulb, and an insulative contact insert means for receiving an electrical contact;

inserting said contact insert means with said electrical contact into said cavity;



inserting said body member means into said cavity; and

welding said body member means to said housing.

4,958,430

MANUFACTURING PROCESS FOR MANUFACTURING THIN EDGE ORIFICE DISKS FOR FUEL INJECTORS

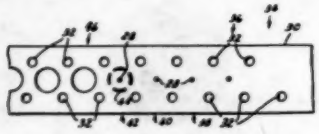
John H. Grieb, and J. Michael Joseph, both of Newport News, Va., assignors to Siemens-Bendix Automotive Electronics L.P., Troy, Mich.

Continuation of Ser. No. 139,128, Dec. 23, 1987, abandoned, which is a continuation of Ser. No. 937,658, Dec. 4, 1986, abandoned. This application Feb. 2, 1989, Ser. No. 306,597

The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.

Int. Cl.[5] B23P *17/00*

U.S. Cl. 29—888.02 **4 Claims**



1. A process for manufacturing a thin edge orifice flat disk for fuel injectors comprising the steps of:

procuring a strip of thin flat stock;

maintaining the flatness of the thin stock;

punching in the stock wherein each aperture has a wall equal to the thickness of the thin flat stock;

punching in the stock the orifice in the correct relationship to the apertures, wherein each orifice has a wall equal to the thickness of the thin flat stock;

coining an edge of the wall of the orifice;

punching the outside perimeter of the disk in relationship to the apertures and the orifice; and then

removing the disk from the thin flat stock.

4,958,431

MORE CREEP RESISTANT TURBINE ROTOR, AND PROCEDURES FOR REPAIR WELDING OF LOW ALLOY FERROUS TURBINE COMPONENTS

Robert E. Clark, Orlando, Fla., and Dennis R. Amos, Rock Hill, S.C., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

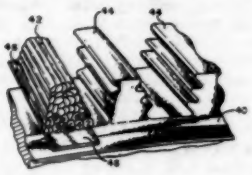
Division of Ser. No. 168,097, Mar. 14, 1988, Pat. No. 4,897,519. This application Mar. 20, 1989, Ser. No. 325,759

Int. Cl.[5] B22D *6/00*

U.S. Cl. 29—889.1 **5 Claims**

1. In a steam turbine system having a rotor comprising a Cr-Mo-V alloy having less than about 6 wt. % alloying ingredients for securing blades, the improvement comprising:

a plurality of layered weldments, including at least two spaced apart weldments, disposed on said rotor, each of said weldments consisting essentially of a ferrous alloy comprising about 7.0 to 11.0 wt. % Cr and about 0.1 to 3.0



wt. % Mo said weldments forming a build-up on said rotor which can be machined into a blade-retaining device, said rotor being relatively free of cracking resulting from the welding process.

4,958,432

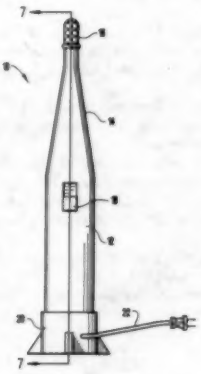
ROTARY HAIR TRIMMER

Willie J. Marshall, 7131 Paseo Blvd., Kansas City, Mo. 64132

Filed Oct. 26, 1989, Ser. No. 426,673

Int. Cl.[5] B26B *19/00*

U.S. Cl. 30—29.5 **20 Claims**



11. A rotary hair trimmer, comprising:

a housing;

a rotary electric motor in said housing;

an output shaft connected to said motor and extending exteriorly of said housing;

means for selectively supplying electric current to said motor;

a cutting head secured to a free end of said output shaft;

said cutting head having a generally cylindrical shape and including a plurality of circumferentially spaced blades; and

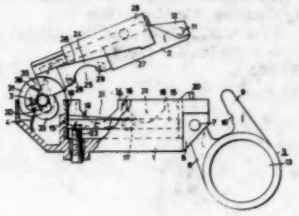
a plurality of arcuate segment blades forming a hemispherical zone on an end of said cutting head.

4,958,433

CABLE STRIPPING TOOL

Lars-Olov Persson, Alvdalen, Sweden, assignor to Preussaster Tool AB, Alvdalen, Sweden

Filed Nov. 16, 1989, Ser. No. 437,390
Claims priority, application Sweden, Nov. 16, 1988, 8804138
Int. Cl.[5] B26B *17/00*
U.S. Cl. 30—91.2 3 Claims



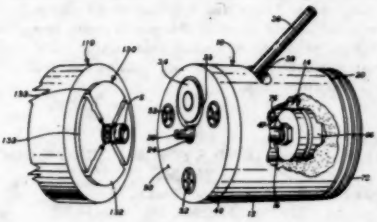
1. A tool for stripping insulation from electric cables, including two elongated jaws which are hinged together at one end thereof and which can be latched in a mutually swung-together position, and in which one tool jaw carries in spaced relationship with its opposite ends at least one cutting blade which extends substantially in the direction of the longitudinal axis of the jaw, and a cable support means for accommodating a cable to be stripped substantially perpendicularly to said blade, and in which the other jaw carries a counter-support means intended for supporting co-action with a cable located on the cable support means, said counter-support means being moveable in a controlled fashion relative to the associated jaw towards and away from the opposing jaw in the swung-together position of said jaws, wherein when in their swung-together position, the jaws can be moved apart to a limited extent at said one end thereof, against the action of a spring bias.

4,958,434

HOLDING DEVICE AND SHEARING DEVICE USED IN CONCERT FOR HAND HELD SHEARING OF THIN-WALL TUBES

Charles F. Marschner, 414 The Circle, Longwood, Fla. 32779

Filed Dec. 22, 1989, Ser. No. 455,281
Int. Cl.[5] A24C *5/12*
U.S. Cl. 30—101 25 Claims



1. Hand operable apparatus for shearing thin-wall sleeve members to a precise, selected length without causing sidewall collapse, said apparatus comprising,

an elongate, generally cylindrical body having a partially hollow interior,

an elongate support mandrel mounted in a cantilever manner on the longitudinal centerline within said cylindrical body,

one end of said support mandrel being supported adjacent one end of said generally cylindrical body,

the other end of said support mandrel being free and of a diameter such that the end of a thin-walled sleeve member to be cut to length can be closely received thereon,

cutoff means operatively mounted by support means on said generally cylindrical body adjacent the free end of said support mandrel, said cutoff means being manipulated by means of a finger operated lever,

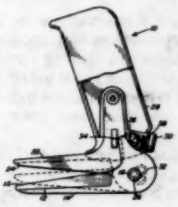
said cutoff means being operable toward said support means to bring cutoff means into contact with the sleeve member at a selected location.

4,958,435

RIPPING SCISSORS

Jeffrey W. Grubbs, and David S. Chapin, both of Raleigh, N.C., assignors to Cooper Industries, Inc., Houston, Tex.

Filed Dec. 9, 1988, Ser. No. 282,236
Int. Cl.[5] B26B *13/00*
U.S. Cl. 30—248 17 Claims



1. A device for cutting fabric or the like comprising:

a substantially horizontal fixed blade having a cutting edge and a pivot hole;

a moving blade having a cutting edge and a pivot hole;

a handle rigidly affixed to said moving blade to form an acute angle therewith;

means for attaching said substantially horizontal fixed blade to said moving blade at said pivot holes;

means for biasing said substantially horizontal fixed blade to an open position with respect to said moving blade; and

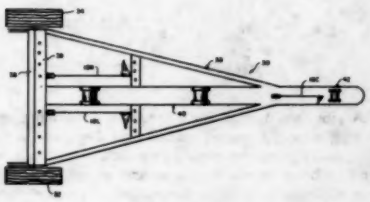
means to prevent pivoting of the moving blade and the horizontal fixed blade towards each other to a point past a certain adjustable limit.

4,958,436

TRAILER HITCH GUIDE

Karl J. Tusche, R.D. #1, Box 347, Easton, Pa. 18042

Filed May 4, 1989, Ser. No. 347,230
Int. Cl.[5] B60Q *1/26*
U.S. Cl. 33—264 2 Claims



1. A trailer hitch guide device for visually assisting a driver in maneuvering a vehicle having a centerline and a first engageable portion of a trailer hitch mounted thereon to a position relative to a trailer having a centerline and a second en-

gaging portion of such trailer hitch so as to align the trailer hitch portions in position to be removably engaged to couple the trailer to the vehicle, comprising:

a plurality of visual guides mounted on a structural element of the trailer, said visual guides being located on the trailer in positions to be visible to the vehicle driver and being positioned to be used by that driver in aligning the vehicle engageable portion of the trailer hitch with the second engageable portion of the trailer hitch, two of said visual guides being positioned adjacent to the centerline of the trailer and being located on opposite sides of that trailer centerline, each of said visual guides including

(1) a bracket which is mounted on the trailer,

(2) a spring mounted on said bracket,

(3) a rod connected at one end thereof to said spring to be flexibly mounted on the trailer, and

(4) a visible indicator connected to said rod,

said rod flexible mounting being arranged to permit said rod to move from a first position which is essentially co-planar with the trailer structural element to a second position which is essentially upright with respect to said first position; and

a third visual guide mounted on the trailer between the trailer hitch mounted second engaging portion and said two visual guides and forming a triangle with said two visual guides, with said visual guides forming an isosceles triangle, said isosceles triangle including equal legs extending from said third visual guide to each of said two visual guides, and

a transparent guide template mounted on a rear view mirror of the vehicle, said template including

(1) guide lines for use by the driver in determining the planar position of the vehicle with respect to the trailer,

(2) second guide lines for use by the driver in determining the out-of-plane position of the vehicle with respect to the trailer, and

(3) means for mounting said guide template on said rear view mirror.

4,958,437

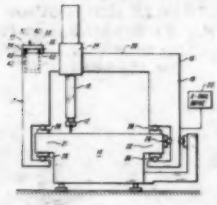
COORDINATE MEASURING MACHINE WITH VIBRATION DAMPER

Israel F. Helms, Coventry, R.I., assignor to Brown & Sharpe Manufacturing Company, North Kingstown, R.I.

Filed Feb. 10, 1989, Ser. No. 309,692

Int. Cl.[5] G01B 21/04, 5/03, 7/03

U.S. Cl. 33—503 **13 Claims**



1. A vibration damper for a precision positioning apparatus including a base, a pair of spaced rails disposed on the base, two supports, one support riding on each of said rails, a bridge extending between the supports, and means associated with one of said rails for driving the bridge and supports along said rails, said vibration damper comprising:

a block having a substantial mass; and

means for supporting said block only on one side of said block above a center of gravity of said block at a fixed position spaced from the driving means, said supporting means comprising a low resiliency material having a rebound resilience less than 20 percent as measured by the pendulum method.

4,958,438

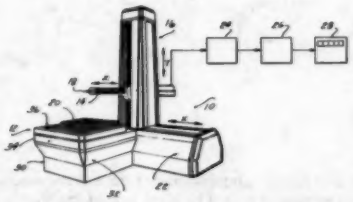
ROTARY TABLE FOR A COORDINATE MEASURING MACHINE AND METHOD OF DETERMINING THE AXIS OF TABLE ROTATION

Thomas L. Hemmelgarn, Dayton, Ohio, assignor to The Warner & Swasey Company, Cleveland, Ohio

Filed Mar. 30, 1989, Ser. No. 332,077

Int. Cl.[5] G01B 5/03

U.S. Cl. 33—503 **10 Claims**



1. In combination, a coordinate measuring machine (10) having a probe tip (18) movable along three orthogonal axes (X,Y,Z) within a measuring envelop, distance transducers (24) generating electrical signals corresponding to said movement to enable measurements to be made by moving said probe tip (18) between points on a workpiece (W), a workpiece support table (12) having a top plate (36) supported on a table base (40), said table top plate (36) providing a supporting surface (20) for a workpiece (W) located within said measuring envelop to enable access by said probe tip (18), bearing means (116, 128, 136) supporting said table top plate for rotation about an axis (a) and drive means (38) for rotating said table top plate (36) about said axis characterized by:

a retractable datum ball assembly (140) including a locating feature (144), means (142) fixing said datum ball assembly (140) relative to said table base (40) adjacent said table top plate (36), means (146) for selectively extending and retracting said locating feature (144) between an up position above said table surface (20) and within said measuring envelop and a down position below said table surface (20) and outside said measuring envelop, said locating surface (144) positioned to be accessible by said probe tip (18) when in said up position;

and locating means (178, 182) acting on said datum ball assembly to locate said locating feature in space within said measuring envelop above said table in a predetermined, precisely repeatable relationship with said table axis of rotation whenever said locating feature is extended to said up position.

4,958,439

METHOD AND DEVICE FOR ALIGNING VEHICLE FRAME

Freddie H. Dehn, R.R. 2, Ray County, Mo.

Filed Nov. 30, 1989, Ser. No. 444,005

Int. Cl.[5] G01B 5/25

U.S. Cl. 33—608 **15 Claims**

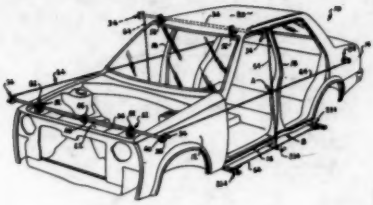
1. Apparatus for determining the extent of damage to a vehicle body, said apparatus comprising:

first and second means adapted to be coupled with said vehicle body on one side for holding a first string in spaced relationship to said body;

first string means adapted to be drawn taut between said first and second holding means;

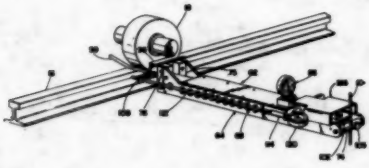
third and fourth means for holding a second string in spaced relationship to said body and adapted to be coupled with

said vehicle body on the opposite side from said one side at a location corresponding to the location of said first and second means on said one side; and



second string means adapted to be drawn taut between said third and fourth holding means.

4,958,440
STACKER ALIGNMENT DEVICE
George R. Pipes, Salt Lake City, Utah, assignor to Eaton Corporation, Cleveland, Ohio
Filed Apr. 17, 1989, Ser. No. 338,672
Int. Cl.[5] G01B 5/255; G01D 21/00
U.S. Cl. 33—645 **14 Claims**



1. Apparatus for determining the alignment of a wheel or a rail-supported vehicle with respect to the rail comprising a base member, means for maintaining a surface of said base member in contact with a surface of said wheel perpendicular to its axis of rotation, an elongated first bar mounted at one end to said base member for pivotal movement about an axis parallel to said surface of said base member, means for selectively fixing said first bar relative to said base member in a position perpendicular to said surface of said base member, means fixed to the opposite end of said first bar operable to indicate the angular orientation of said first bar relative to horizontal when said surface of said base member is in contact with said wheel and said first bar is in said fixed position, and first and second guide rods extending outward from said base member in position to straddle said wheel, at least one of said guide rods curving upward and outward such that contact of the rod with the rail causes the apparatus to move upward in relation to the rail when the apparatus is moved toward the rail.

4,958,441
CENTER PUNCH BLOCK DEVICE
Richard S. Bigelow, 1404 Pamlico Blvd., Chesapeake, Va. 23320
Filed Apr. 17, 1989, Ser. No. 339,227
Int. Cl.[5] B25D 5/00
U.S. Cl. 33—670 **7 Claims**

1. A centering device for imparting an indicator mark medially of an upper surface of an elongate workpiece secured to an underlying support surface, said device comprising,

a body member including an upper surface spaced from a bottom surface, and

a forward wall orthogonally oriented to the upper surface and the bottom surface, and

a rear wall parallel to the forward wall, and

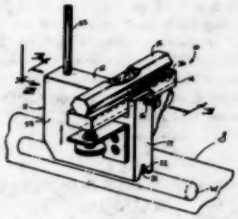
a right side surface orthogonally oriented to the upper surface spaced from a left side surface;

said upper surface including a slot, and an elongate indicator means pivotally mounted in said slot for indication of the relative ridge of the support, and

adjustment means for pivoting said indicator means relative to said slot, and

a work receiving further slot coextensively formed within said bottom surface, and

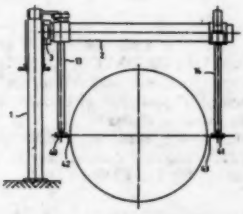
a punch extending through said body member extending outwardly of said upper surface at one end and extending orthogonally into said further slot at its other end, and



wherein said slot is formed through said upper surface and is orthogonally oriented relative to the bottom surface and associated further slot, and

wherein said adjustment means includes a support beam pivotally mounted within said slot and spaced above a floor defining a lowermost end of said slot, and said support beam having secured thereto a level indicator aligned with said support beam, and a pivot pin orthogonally directed through said forward wall and through said support beam to pivotally mount said support beam and indicator relative to the floor.

4,958,442
MEASURING DEVICE, SPECIFICALLY FOR MEASURING THE DIAMETER OF ROLLS ON ROLL GRINDERS
Roland Eckhardt, Giengen, Fed. Rep. of Germany, assignor to J. M. Voith GmbH, Heidenheim, Fed. Rep. of Germany
Filed Aug. 21, 1989, Ser. No. 396,440
Claims priority, application Fed. Rep. of Germany, Aug. 19, 1988, 3828181
Int. Cl.[5] G01B 5/08, 3/38
U.S. Cl. 33—783 **4 Claims**



1. A measuring device for a roll grinder comprising:

a vertical column having a longitudinal axis;

a boom supported by said column and mounted thereto so as to be swivelable about,.the longitudinal axis of said column;

a rotatable arm mounted to said column for rotation about the axis of said column;

a guide arm mounted to said rotatable arm and articulated therewith, said guide arm extending parallel to said boom;

a cross beam mounted to said column via said guide arm and said boom that said boom, rotatable arm, guide arm and an interposing section of the cross beam form a parallel crank drive, said cross beam further being mounted so as to be swivelable parallel to said rotatable arm in a horizontal plane extending perpendicularly to said column, said cross beam supporting a first vertical measuring support bar near said column disposed parallel to the axis of said column, and supporting a second vertical measuring support bar away from said column disposed parallel to the axis of said column, said first and second vertical measuring support bars being supported for vertical displacement parallel to the axis of said column through a respective rotary coupling each, said cross beam further supporting said vertical measuring support bars for horizontal displacement perpendicular to the axis of said column; and

a clamping device disposed at the mounting of said rotatable arm to said column for clamping said rotatable arm to said column against rotation.

4,958,443

METHOD AND APPARATUS FOR TREATING BULK MATERIAL

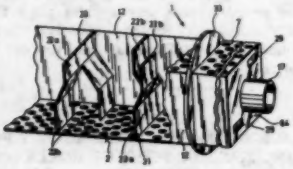
Walter Haueter, Kirchstrasse 8, 9532 Rickenbach; Hans-Ulrich Pfaffhauser, Sonnenbergstrasse 16, 9524 Zuzwil, and Karl Benz, In der Breiti 28, 9244 Niederuzwil, all of Switzerland

Filed Feb. 29, 1989, Ser. No. 317,183

Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808282

Int. Cl.[5] F26B *17/00*

U.S. Cl. 34—57 D **41 Claims**



1. A method for treating bulk material by means of a gas, the method comprising the steps of

introducing the bulk material to be treated into a container having at least one wall being at least partially perforated;

causing the gas to flow through the at least partially perforated wall of the container to provoke a fluidization of the material;

rotating the container about an axis.

4,958,444

APPARATUS FOR DRYING A FIBRE WEB

Paavo Rautakorpi, Tampere; Jukka Lehtinen, Helsinki, and Pekka Majaniemi, Pirkkala, all of Finland, assignors to Oy Tampella AB, Tampere, Finland

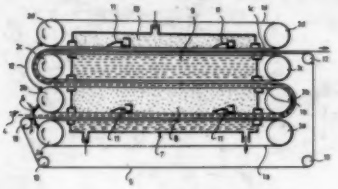
Filed May 8, 1989, Ser. No. 348,858

Claims priority, application Finland, May 18, 1988, 882337

Int. Cl.[5] F26B *19/00*

U.S. Cl. 34—71 **7 Claims**

7. An arrangement for mounting rolls (*2a–2d; 3a–3d*) in a drying apparatus comprising at least two endless, air-tight bands (*1a–1d*) with good thermal conductivity, which bands are arranged to move around said rolls (*2a–2d* and *3a–3d*) on top of each other in a direction perpendicular to the surface of a web (4) in such a manner that said bands (*1a, 1b; 1b, 1c; 1c, 1d*) are substantially parallel and adjacent with each other between the rolls (*2a, 3a; 2b, 3b; 2c, 3c; 2d, 3d*) to form at least two drying zones positioned on top of each other, the web (4) and the drying felt (5; 5', 5") being led between two bands (*1a, 1a; 1b, 1c; 1c, 1d*) in such a manner that the web (4) makes contact with the surface of one band (*1b, 1d*) and the drying felt (5; 5', 5") with the surface of the other band (*1a, 1c*), characterized in that two rolls (*2a, 2b; 2b, 2c; 2c, 2d, 3a,3b, 3c; 3c, 3d*) immediately on top of each other in a direction transverse to the surface of the web (4) are mounted in the direction of movement of the web (4) in such a manner that their axes are at a distance (L) from each other.



4,958,445

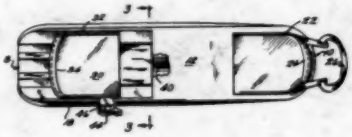
WALKING SOLE ACCESSORY FOR A SKI BOOT

Gregory J. Brisco, 106 Woodlyn Ave. #3, Glenside, Pa. 19038

Filed Jun. 30, 1989, Ser. No. 375,202

Int. Cl.[5] A43B *5/04*

U.S. Cl. 36—7.5 **4 Claims**



1. A walking sole accessory for a ski boot, comprising:

a sole longitudinally extending from a toe end to a heel end and having a convex bottom surface, an outer side panel, an inner side panel, and a flat top surface for engaging a bottom surface of a ski boot, said sole having a nonuniform thickness between the flat top surface and the convex bottom surface wherein the thickness is dependent upon longitudinal distance from the toe end of the sole,

a row of locking teeth disposed along the outer side panel of the sole and near the toe end of the sole,

a row of locking teeth disposed along the outer side panel of the sole and near the toe end of the sole,

first boot gripping means rigidly mounted on the top surface of the sole,

second boot gripping means slideably mounted on the top surface of the sole,

resilient means for biasing the second boot gripping means towards the first gripping means,

a locking lever rotatably mounted on the second gripping means and including a projection for releasably engaging the locking teeth.

4,958,446

FOOTWEAR AND ADAPTION THEREOF FOR PRODUCTION OF ADVERTISING MESSAGE

James G. Brown, 44 Harding Boulevard, Scarborough, Ontario, Canada M1N 3C9

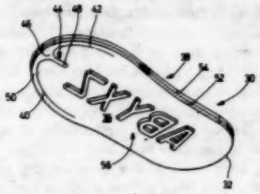
Filed Oct. 26, 1988, Ser. No. 262,580

Int. Cl.[5] A43B *3/12*

U.S. Cl. 36—11.5 **4 Claims**

1. A sandal formed of sheet material with a pair of opposing faces and a peripheral side edge, a pair of blind-ended slits being formed in a forward portion of the sheet material inset from the peripheral side edge and extending between the op-

posing faces, the slits being shaped to define in the sheet material an elongate stem with a forward stem portion and a rear stem portion which is hinged to the rest of the sheet material and to define in the sheet material a strap integral with the forward stem portion and extending laterally to either side of the forward stem portion, the sheet material being sufficiently



flexible that the stem and strap can be raised by hand from the general plane of the sheet material, the stem being dimensioned to be received between the toes of a wearer's foot and the strap being shaped to overlay the wearer's foot and to retain the sandal to the wearer's foot when the stem is received between the wearer's toes.

4,958,447

ATHLETIC SHOE WITH BREAK-AWAY HIGH TOP

Tony L. DuPree, 2413 Skyline Dr., Box 7, Garner, N.C. 27529

Filed Jun. 23, 1989, Ser. No. 370,762

Int. Cl.[5] A43B *3/24*

U.S. Cl. 36—101 **5 Claims**

1. A convertible athletic shoe comprising:

(a) a sole portion;

(b) an upper fixed to the sole portion including a heel portion, side portions and a toe portion, wherein the upper defines an ankle opening and a tongue opening and wherein the upper includes a lace border adjacent the tongue opening having a series of lace holes formed therein;

(c) a shoe lace threaded through the lace holes in the upper for securing the shoe to the wearer's foot when the lace is tied;

(d) a detachable high top releasably secured to the upper for converting the shoe from a low top shoe to a high top shoe, the high top including an ankle cuff adapted to wrap around the wearer's ankle, wherein the ankle cuff includes a lower edge portion which overlaps the heel portion of the upper and a pair of connecting straps having at least one lace opening formed therein, wherein the connecting straps extend generally forwardly from the ankle cuff and overlap the lace border of the upper so that at least one lace opening in each connecting strap aligns with at least one lace hole in the upper, and wherein the shoe lace can be threaded through the lace opening in the connecting strap to aid in securing the detachable high top to the upper; and

(e) cooperative fastening means including first and second fastener components attached respectively to the heel portion of the upper and the lower edge portion of the ankle cuff for releasable securing the high top to the upper.

4,958,448

SKI BOOT WITH INSERT PIECE

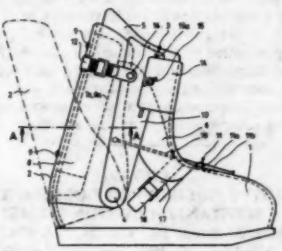
Andreas Wenzel, Gamprin, Liechtenstein, assignor to Fire-Generation Establishment, Gamprin, Liechtenstein

Filed Feb. 6, 1989, Ser. No. 306,948

Claims priority, application Switzerland, Feb. 12, 1988, 00502/88

Int. Cl.[5] A43B *5/04, 7/14*

U.S. Cl. 36—119 **10 Claims**



1. A ski boot, comprising:

a lower shell (1) which encloses at least a foot of a skier;

a longitudinal shaft having a rear portion (2) and a front portion (3), the shaft being arranged so as to enclose the skier's lower leg, the rear portion (2) of the shaft enclosing a back part of the lower leg and the front portion (3) enclosing a front part of the lower leg, the rear portion (2) and the front portion (3) of the shaft being connected with the lower shell (1) in an articulated manner, and the rear portion (2) and the lower shell (1) overlap at least partially;

a clamping device (10, 11) for producing an inclination position of the rear portion (2) of the shell; and

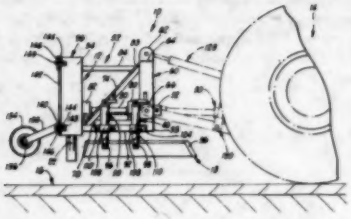
stops provided at the lower shell (1) and at the rear portion (2) of the shaft so as to define the inclination position of the rear portion (2), the lower shell (1) having, in an area enclosing the lower leg, a cut out portion (7) which extends from an upper end of the shell shaft along a greater part of the shaft length and is open toward the rear portion (2) of the shafts, and an exchangeable insert piece (8, 19) at the rear portion (2) of the shaft which is assigned to the cut out portion (7), the stops being formed by flanks (76a, 8a19a) of the cut out portion (7) and of the insert piece (8, 19) which extend in the longitudinal direction of the shaft.

4,958,449

APPARATUS FOR COVERING DRILLING MUD LIQUIDS IN A SURFACE DEPRESSION

Paul L. Prater, Rte. 2, Box 50, Marlow, Okla. 73055

Filed Dec. 19, 1988, Ser. No. 286,242
Int. Cl.[5] E02F *3/24, 3/18*
U.S. Cl. 37—93 **3 Claims**



1. A soil-projecting apparatus which is attachable to the rear of a self-propelled vehicle for forward travel, comprising:

a frame connectable to said vehicle;

a drive shaft member supported on said frame and extending longitudinally of said vehicle, said drive shaft member being connectable to and rotatable with a power take-off of said vehicle;

a wheel portion connected to said drive shaft member;

a plurality of soil-engaging scoops angularly spaced around said wheel portion and attached thereto;

a wheel case mounted on said frame for substantially enclosing said wheel portion and at least a portion of said scoops;

a plurality of elongated blade members independently adjustably mounted to said frame and adapted for engaging soil and displacing said soil toward said scoops as said vehicle moves along a ground surface; and

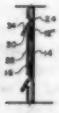
an adjustably directed chute attached to said wheelcase for directing soil projected from said scoops.

4,958,450

PROTECTIVE HOLDER FOR HOLDING THIN OR SUBSTANTIALLY THIN ITEMS

Paul J. Roberg, 51 Surrey La., Tenafly, N.J. 07670

Filed Sep. 20, 1988, Ser. No. 246,699
Int. Cl.[5] B65D *27/22*
U.S. Cl. 40—159 **2 Claims**



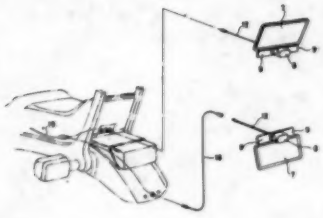
1. A holder for thin items comprising: a backing sheet having a length, and a width; a plurality of strips having a length, a width substantially equal to the width of said backing sheet, each of said strips having an upper edge and a lower edge, said strips being connected to said backing sheet along a longitudinal connection line running substantially parallel to each of said strip edges spaced from said lower edge a distance which is less than the distance said longitudinal connection line is spaced from said upper edge, and said strips each being connected to said backing sheet along a plurality of transverse connection lines running substantially transverse to said longitudinal connection line, each transverse connection line extending toward the upper edge of the corresponding strip from adjacent said longitudinal connection line of a corresponding strip and terminating at a location spaced from said upper edge of the corresponding strip, each of said plurality of strips being located along the length of said backing sheet, such that strips positioned between upper and lower adjacent strips have upper and lower overlapping portions, said upper overlapping portion being defined between the location of termination of said transverse connection lines and the upper edge of the corresponding strip, said lower overlapping portion being defined between the longitudinal connection of the corresponding strip and the lower edge of the corresponding strip, said lower overlapping portion being positionable to overlap said upper overlapping portion of an adjacent strip and said lower overlapping portion being positionable to underlap said upper overlapping portion of the adjacent strip.

4,958,451

MOTORCYCLE LICENSE PLATE MOUNTING MECHANISM

Masato Iwakura, Saitama, and Hiroshi Nakano, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 418,958, Sep. 16, 1982, abandoned. This application Sep. 26, 1985, Ser. No. 780,240
Claims priority, application Japan, Sep. 19, 1981, 56-148252
Int. Cl.[5] G09F *13/02*
U.S. Cl. 40—204 **9 Claims**



1. A motorcycle license plate mounting mechanism, comprising; a license plate adapted to be attached to the body of the motorcycle, the attachment position of said license plate being changeable, said body providing separated mounting locations for said license plate; license plate mounting means engageable at said mounting positions, a lamp for illuminating said license plate, wiring means for said lamp and a wiring harness engaging said wiring means.

4,958,452

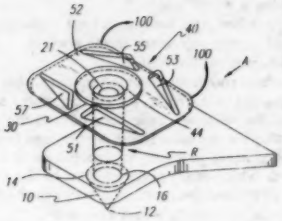
ANIMAL IDENTIFICATION EAR TAG ASSEMBLY

Lloyd Tate, Georgetown, Tex., assignor to Zoecon Corporation, Dallas, Tex.

Filed Sep. 27, 1989, Ser. No. 413,327
Int. Cl.[5] G09F *3/00*; F16B *43/00*
U.S. Cl. 40—301 **9 Claims**

1. An animal ear tag assembly comprising: a rivet having a stem portion, a conical head portion located at one distal end of said stem portion, and a disk portion located at the other distal end of said stem portion; an identification tag slidably mounted on said stem portion and adjacent to said head portion when said assembly is applied to an animal; and a flexible base slid-

ably mounted on said stem portion and adjacent to said disk portion when said assembly is applied to an animal, said base having a plurality of elongated reinforcement ramps located on



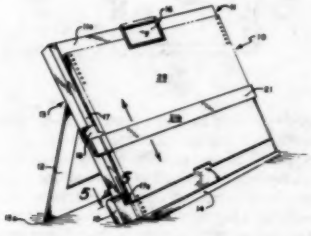
an outer side of said base nearest said disk portion, said ramps having sufficient height and thickness to provide protection for said disk.

4,958,453

MULTIDOCUMENT HOLDER WITH ARTICULATING LINE GUIDE

Robert J. Mangler, Chicago; Anne J. Maraland, Schaumburg; George O. Podd, Chicago, and Russell Schweizer, Crystal Lake, all of Ill., assignors to Wilson Jones Company, Chicago, Ill.

Filed May 2, 1989, Ser. No. 346,047
Int. Cl.[5] B41J *11/64*
U.S. Cl. 40—352 9 Claims



1. A copyholder having a planar body including a stack holding surface and a body side section, a stand to support the planar body at an angle to a support surface and a pivotable line guide comprising:

a. the stack holding surface sized to hold an object having a top surface;

b. an elongated block means pivotably connected to the body side through pivot means having an axis parallel to the surface of the planar body, such block means having an effective length equal to the maximum thickness of the objects that the holding surface can accommodate;

c. an arm pivotably mounted on the block means for movement in a vertical plan; and

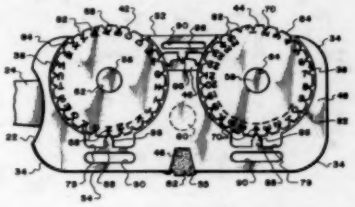
d. a line guide including line guide surface slidably connected on the arm for adjustable movement thereon; whereby the elongated block means and the arm can be pivoted to place the line guide surfaces parallel to the top surface of the object.

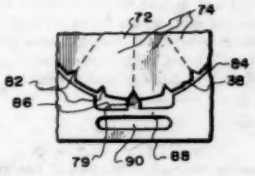
4,958,454

DATA RECORDER

Mary K. Chan, 252 N. Crimea St., Ventura, Calif. 93001, and Victor Osaka, 11925 Louise Ave., Los Angeles, Calif. 90066

Continuation of Ser. No. 117,973, Nov. 9, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 380,249
Int. Cl.[5] G09F *11/04*
U.S. Cl. 40—495 8 Claims





1. An information recording device comprising in combination:

a body in the form of a thin plate having a pair of generally flat opposite surfaces, said body having first and second side-by-side spaced apart recessed wheel wells formed in one of said opposite surfaces with portions of said first and second wheel wells being open at a first edge of said body, said body also having a third recessed wheel well formed in the other of said opposite surfaces with a portion of said third wheel well being open at an opposite second edge of said body, said third recessed wheel well having at least a section overlapping at least one of said first and second recessed wheel wells, each of said recessed wheel wells being annular in shape and defining a central hub on said respective one and the other of said opposite surfaces;

first, second and third wheels each carrying a plurality of indicia information on an outer circumferential band and having a central aperture for rotatably mounting said wheel in the corresponding one of said wheel wells on said hub thereof with a portion of said wheel extending from said respective one of said first and opposite second edges of said body at said open portion of said wheel well;

first and second flat covers assembled together with said body therebetween such that said flat covers fit generally flush against said flat opposite surfaces of said body and over said respective wheels disposed in said respective wheel wells, said covers also being disposed over the respective exposed outer circumferential bands of said wheels and each having an aperture of a size limited to view a single indicia on said band of said respective wheel; and

means formed on an edge of each wheel and on said body adjacent said respective wheel wells for indexing and locking each of said wheels in a set position with a selected indicia positioned adjacent said respective first and second edges of said body and exposed through said respective apertures of said covers.

4,958,455

PIVOTLESS WHEEL INDICIA DISPLAY DEVICE

Roger V. Jacobsen, Chicago, Ill., assignor to Gary Jacobsen, Bensenville, Ill.

Filed May 16, 1989, Ser. No. 352,768
Int. Cl.[5] G09F *11/04*
U.S. Cl. 40—495 **12 Claims**

1. An indicia display device comprising:

rotatable wheel means having said indicia fixed thereon, circular pocket means for pivotlessly mounting said rotatable wheel means for rotation in said pocket means, and a viewing opening in said device through which selected indicia appear, said device being formed from a single sheet of material which is divided into a plurality of panels, said panels being folded over and overlapping each other to form said circular pocket means.

4,958,456

INSECT ERADICATION

James J. Chaudoin, Norco, and Michael R. Linford, Villa Park, both of Calif., assignors to Isothermics Incorporated, Long Beach, Calif.

Filed Jan. 16, 1990, Ser. No. 465,431
Int. Cl.[5] A01M *1/20*
U.S. Cl. 43—124 **11 Claims**

1. The method of killing insects in spaces and on surfaces comprising:

(a) dispersing boric acid into spaces and onto surfaces known or believed to be inhabited by insects to be killed; and, thereafter,;

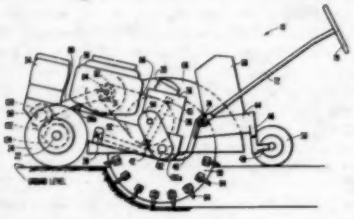
(b) heating the spaces and surfaces onto which boric acid has been dispersed to a temperture of at least about 110° F. for a period of at least about one-half hour or greater until substantially all insects in said spaces and on such surfaces are dead.

4,958,457

TRENCH DIGGING OR ROOT CUTTING DEVICE

David Doskocil, 1227 Fulbright Avenue, Redlands, Calif. 92373

Filed Mar. 3, 1989, Ser. No. 318,584
Int. Cl.[5] E02F *5/08*
U.S. Cl. 37—94 **17 Claims**



1. An apparatus for ditch digging or root pruning comprising:

a frame having a main frame portion and a secondary frame portion;

a main wheel axis having at least two main wheels rotatably mounted on opposite sides of the main frame portion establishing a wheel width;

a secondary wheel axis having at least a secondary wheel supported on the secondary frame portion;

a motor mounted on the frame;

a cutting wheel rotatably mounted on the frame and operably connected to the rotor, the cutting wheel rotating in a substantially vertical plane located outside the wheel width, wherein the main frame portion and the secondary frame portion are pivotably connected about a horizontal pivot axis which is (a) perpendicular to the plane of the cutting wheel and (b) positioned between the main wheel axis and the secondary wheel axis; and

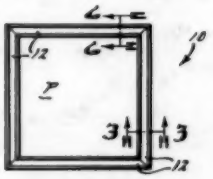
means for pivoting the main frame portion relative to the secondary frame portion about the horizontal pivot axis, such that the pivoting of the frame portions raises or lowers both the cutting wheel and the horizontal pivot axis.

4,958,458

POSTER DISPLAY DEVICE WITH LONGITUDINAL RETENTION OF FRAME SECTIONS BY INSERTS

David U. Hillstrom, Novi; Randall Palmer, Farmington Hills, and Brian J. Hillstrom, Walled Lake, all of Mich., assignors to Marketing Displays, Inc., Farmington Hills, Mich.

Continuation-in-part of Ser. No. 25,398, Mar. 13, 1987. This application Feb. 23, 1989, Ser. No. 315,400
Int. Cl.[5] A47G *1/06*; G09F *1/12*
U.S. Cl. 40—156 **33 Claims**



1. In a display holder having a plurality of elongated frame sections forming a frame structure for receiving and holding a display piece, each of said sections having a pair of elongated front and back members adapted to be assembled in a longitudinally aligned interconnected arrangement with one another, the improvement wherein a first of said elongated front and back members has an opening formed therein and an elongated rod member insertably received in said opening, said rod member interlockingly engaging the other of said elongated front and back members in order to substantially prevent longitudinal movement of said front and back members relative to one another when in said aligned interconnected arrangement.

4,958,459

LETTER LACE

Orlando D. Davidson, 409 Harrison Rd., Fredericksburg, Va. 22401

Filed Jan. 6, 1989, Ser. No. 293,974
Int. Cl.[5] G09F *23/00*
U.S. Cl. 40—636 **7 Claims**

1. An indicia carrying attachment comprising: an elongated, unitary body member having parallel frontal and rear surfaces joined by at least one pair of opposite transverse surfaces, longitudinal opening extending linearly through said body member having a configuration corresponding approximately to a shoe lace; indicia carried by said frontal surface; a longitudinal slit located in said rear surface and having a dimension

approxiamte to the width of said lace; whereby said indicia carrying attachment may be selectively attached to said lace by

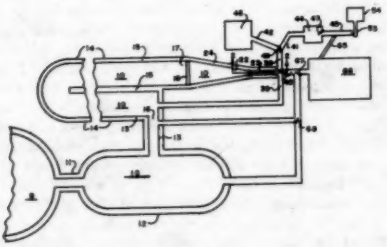
sliding said lace edgewise through said slit, and thereafter rotating said attachment about said lace unitl said frontal surface is parallel with the horizontal plane of said lace.

4,958,460

METHOD OF GROWING AND HARVESTING MICROORGANISMS

Jay P. Nielson, Salt Lake City, and Paul A. Sturm, Ogden, both of Utah, assignors to Algae Farms, Salt Lake City, Utah

Filed May 9, 1988, Ser. No. 191,993
Int. Cl.[5] A01G *33/00*
U.S. Cl. 47—1.400 **7 Claims**



1. A process for the reproduction and harvesting of algae of the genus Dunaliella and associated bacteria, comprising the steps of:

providing a culture zone of a saline liquid growth medium having a cross-sectional width to depth ratio of at least about 500 to 1 and a length allowing sufficient production of algae for harvest;

providing a harvest zone having a cross-sectional width to depth ratio of about within the ranges of 1 to 1 and 1 to 4;

providing a graduated transition zone fluidly communicating said culture zone and said harvest zone;

exposing said production, transition, and harvest zones to light to allow said algae to agglomerate and remain near the surface of said medium;

flowing the medium through said culture, transition, and harvest zones, whereby said agglomerated algae is concentrated into a horizontal band having vertical depth at the surface of the medium; and,

separating said band from the remainder of said medium to effect harvest of said algae.

4,958,461

FLORAL HOLDER AND DISPLAY

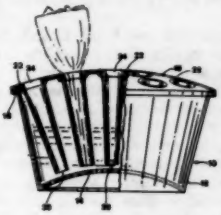
Jay L. Aldrich, Miami, Fla., assignor to Sterling Bouquet, Miami, Fla.

Filed Jan. 3, 1989, Ser. No. 293,052
Int. Cl.[5] A01G *5/00*
U.S. Cl. 47—41.01 **12 Claims**

1. A device for holding and displaying a plurality of floral bouquets which comprises:

a bucket deep enough to contain flower stems, said bucket having a convexly curved inner bottom wall;

a convexly curved lid shaped and dimensioned to removably fit on said bucket, said lid being formed with a plurality of spaced apart openings thereon; and



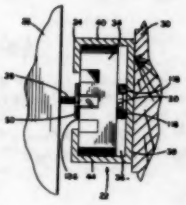
a plurality of conical sleeves supported by said lid and extending downward from said lid and contained within said bucket when said lid is mounted on said bucket, each sleeve having an upper open end in communication with a separate one of said lid openings, each sleeve having an open lower end in communication with the interior of said bucket when said lid is mounted on said bucket.

4,958,462

LOCKING PIVOT SHOE

Rex D. Cross, No. 1 Old Church Rd., Greenwich, Conn. 06830

Filed Jun. 5, 1989, Ser. No. 361,528
Int. Cl.[5] E05D *15/22*
U.S. Cl. 49—181 **10 Claims**



1. In an improved pivot shoe assembly for sliding an item along a track, rotating the item about an axis that is generally normal to the track, and by said rotation through rotation transmission means to a pivot shoe, locking the pivot shoe at a predetermined location along the track, said track comprising a first wall, a second wall attached to the first wall, a third wall generally opposed to and spaced from the second wall and attached to said first wall, and a fourth wall generally opposed to and spaced from the first wall, and attached to the second and third walls, said first, second, third, and fourth walls including first, second, third, and fourth inner faces respectively which define a channel for receiving the pivot shoe; the improvement comprising:

said pivot shoe comprising a body for simultaneous locking of said shoe against the four inner faces, said body including a first, a second, a third, and a fourth side of said body, a first portion of said body and a second portion of said body, said first side facing said first inner face, said second side facing said second inner face, said third side facing said third inner face, said fourth side facing said fourth inner face, and said first and second portions being oriented longitudinally with the track when said body is located within said track,

said first portion comprising; a first leg and a second leg, said

first and second legs defining a separation zone between them for divergent movement of said legs, and further defining between them within said separation zone, a passage in the body for receiving a barrel cam,

a barrel cam having a first end and a second end, mounted in said passage for rotation by said rotation transmission means about an axis that is generally normal to said first wall,

said barrel cam and said body defining between them an axial thrust cam for forcing said first end away from the first side of said body for engaging the first inner face of said track and for forcing said body into engagement with said fourth inner face of said track when the pivot shoe is located in the channel, for resisting sliding of said pivot shoe along the track when the barrel cam is rotated over a first angle of a predetermined angular range, said axial thrust cam also being for permitting retreat of said first end of said barrel cam from the first inner face of said track and said body from said fourth inner face when the barrel cam is rotated over a second angle of said predetermined angular range.

said barrel cam and said first leg defining between them a radial thrust cam for forcing said leg away from the axis of said barrel cam for engaging a one of the second and third inner faces of the track by said first leg and the other of the second and third faces by the body when the pivot shoe is located in the channel, for resisting sliding of said pivot shoe along the track when the barrel cam is rotated over a third angle of said predetermined angular range, said radial thrust cam also being for permitting retreat of said first leg and said body from said engagement with the second and third inner faces of the track when said barrel cam is rotated over a fourth angle of said predetermined angular range.

said first and third angles of said predetermined angular range generally coinciding.

4,958,463

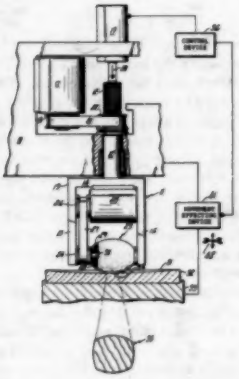
OPTICAL SURFACE QUALITY IMPROVING ARRANGEMENT

Arthur E. Hess, Palm Beach Gardens, Fla., and Gregory M. Sanger, New Fairfield, Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 203,195, Jun. 6, 1988, abandoned. This application Nov. 22, 1989, Ser. No. 442,484

Int. Cl.[5] B24B *7/00*

U.S. Cl. 51—72 R **7 Claims**



1. An arrangement for controlledly removing material from an effective surface of a workpiece, comprising

a support;

a mounting member mounted on said support for movement relative thereto at least in a predetermined direction toward, and opposite to said predetermined direction away from, the effective surface;

a working member mounted on said mounting member for rotation about a rotational axis that extends substantially normal to said predetermined direction, and having an outer circumferential surface that is centered on said rotational axis;

means for rotating said working member about said rotational axis relative to said mounting member;

means for applying to said working member a pressing force acting in said predetermined direction relative to said support so that successive regions of said outer circumferential surface of said working member act on respective infinitesimally small localities of a predetermined zone of the effective surface of the workpiece during the rotation of said working member with respective local pressures dependent on the magnitude of said pressing force and sufficient to remove material from the workpiece;

means for effecting relative movement between said mounting member and the workpiece at least along a plane normal to said predetermined direction with attendant movement of the predetermined zone over the effective surface; and

means for controlling said applying and effecting means, including means for so varying, while said working member is in continuous material-removing contact with the effective surface, at least one of said pressing force applied by said applying means and a speed of said relative movement effected by said effecting means in dependence on the instantaneous position of said predetermined zone on said effective surface that, wherein said working member has at least a portion situated immediately within said outer circumferential surface and being elastically deformable, to be deformed when said applying means applies said pressing force to said mounting member so that said outer circumferential surface of said working member is in area contact with the predetermined zone of the effective surface of the workpiece, and wherein said outer circumferential surface of said working member follows an arcuate course as considered axially of said working member prior to deformation, such said successive regions of said outer circumferential surface of said working member remove the material of the workpiece from different areas of the effective surface to such different depths as needed to bring the effective surface to its desired configuration.

4,958,464

LAPPING MACHINE

Alfredo S. Menendez, Calle Hermanos Machado, No. 18-1°, 24009 Leon, Spain

Filed Jun. 19, 1989, Ser. No. 367,869

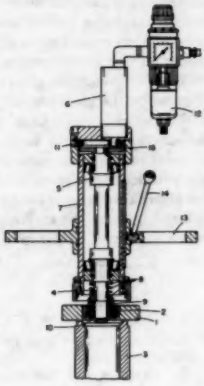
Claims priority, application Spain, May 24, 1989, 8901765

Int. Cl.[5] B24B *19/00*

U.S. Cl. 51—241 VS **1 Claim**

1. A machine for lapping the body seat of a security valve or a pressure relief valve which comprises motor (6) in the upper part thereof, axle (5), a crown gear (11) and a pinion (15) connected to said motor and to said axle for driving said axle when the machine is in operation and the motor is actuated, a lapping disc (1) adapted to lap said valve seat (3) with uniform pressure, the lower part of said axle having part (4) eccentrically disposed thereto, a ball joint (2) positioned above said valve seat; a spring (8) positioned above said ball joint, said spring applying force upon said lapping disc when the machine is in operation to maintain contact between said lapping disc and said valve seat, said lapping disc being capable of frontward-backward motion and an eccentric circular motion, a tubular member (7) exterior to said axle positioned under said motor, a flange (13) for attachment to said body of said valve, a lever (14) connected to said flange, said lever connecting said

tubular member to said flange, said frontward-backward motion being produced by said part (4) eccentric with respect to



said axle, said eccentric circular motion being produced by friction between said lapping disc and said valve seat.

4,958,465

COMBINED ABOVE AND BELOW GRADE DWELLING WITH MARINE HABITAT

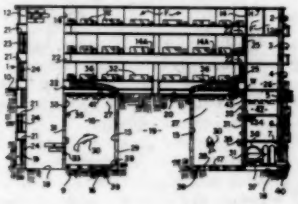
Jacques S. Levy, 1015 33rd St., NW., Washington, D.C. 20007

Filed Sep. 27, 1989, Ser. No. 413,128

The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.

Int. Cl.[5] E02D *27/00*; B63B *35/00*

U.S. Cl. 52—169.1 **3 Claims**



1. An on-shore structural installation for the cohabitation of humans and marine life comprising;

a housing assembly including a plurality of vertically or horizontally stacked levels having a continuous inside wall and outside wall,

each said level provided with a plurality of adjacently connected individual units at least some of which comprise independent living quarters,

one or more said levels defining lowermost levels and disposed within an excavation below ground level,

one or more other ones of said levels defining uppermost levels disposed above ground level,

a plurality of walkways exteriorly of both said housing assembly inside and outside walls each joining adjacent ones of said individual units on a respective said level,

doors in said housing assembly walls providing communication between said units and said walkways,

a water containment located juxtaposed said housing assembly inside wall and disposed laterally adjacent at least one of said levels disposed below ground level,

windows within said housing assembly inside wall permitting occupants within said units in at least one of said levels below ground level to view at their level into water within said water containment,

access means for movement of humans exteriorly of said housing assembly outside wall and connecting to all said walkways above and below ground level and accessible from ground level,

access means for movement of humans exteriorly of said housing assembly inside wall and connecting to all said walkways above ground level,

at least one passage disposed between adjacent ones of said units and extending between said inside and outside walls,

said access means permitting occupants of the housing assembly to move between all said levels, and said access means permitting occupants to have direct entry into water within said containment.

4,958,466

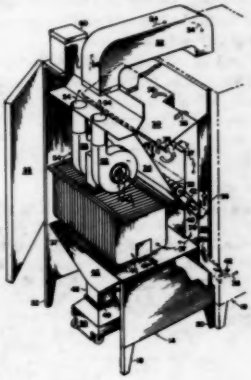
EXHAUST GAS MEDIA SEPARATOR WITH RECYCLING AND DUST COLLECTION

Roger A. Howells, Orefield, Pa., assignor to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Mar. 14, 1989, Ser. No. 323,537

Int. Cl.[5] B24C *9/00*

U.S. Cl. 51—425 **3 Claims**



1. An apparatus for recovering blasting media and separating dust from a cryogenic carrier gas for reintroduction into a blast treating chamber comprising in combination:

an insulated enclosure containing means to withdraw cold carrier gas with blasting media and other particles entrained therein from said blast treating chamber and introduce said withdrawn cold carrier gas and blasting media into an inlet in said insulated enclosure;

a system of baffles disposed in the path of said cold carrier gas containing entrained media to effect a velocity loss of said media causing said media to separate from said cold carrier gas and a hopper for collecting media said hopper containing means including a motorized auger communicating with a conduit which in turn is connected to said blasting media inlet in said insulated enclosure for returning said media to said blast treating chamber for reuse;

means within said insulated enclosure to remove fine particles entrained in said cold carrier gas;

means to return said cold carrier gas to said blast treating chamber in order to recover refrigeration from said cold carrier gas in said blast treating chamber; and

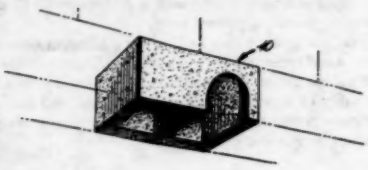
means to exhaust excess cleaned carrier gas from said apparatus to ambient temperature.

4,958,467

BORING APPARATUS AND METHOD OF MODIFYING CONCRETE BLOCKS

Samuel R. Becker, 4336 Eastwood Dr., Sarasota, Fla. 34232

Filed Feb. 8, 1990, Ser. No. 477,330
Int. Cl.[5] E04B *1/60*
U.S. Cl. 52—127.7 **3 Claims**



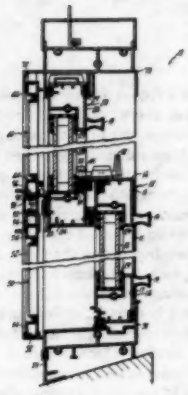
1. A rectangular concrete block comprising:
upright parallel side and end walls, said side walls spaced apart by said end walls, and at least one interior transverse partition which forms at least two upright cavities through said block;
a cylindrical inspection hole formed into one said side wall in alignment and registry with one said cavity;
said inspection hole having an axis at an acute angle with respect to vertical and having a diameter generally equal to the length of said cavity;
said inspection hole offset vertically with regard to said side wall, extending from through one horizontal edge margin of said side wall toward, but not to, the other horizontal edge margin of said side wall.

4,958,468

COMBINATION SUPPORT AND ATTACHMENT BAR FOR A WINDOW

William A. Nolan, Louisville, Ky., assignor to United Technologies Automotive, Inc., Dearborn, Mich.

Filed May 7, 1986, Ser. No. 860,716
Int. Cl.[5] E06B *1/04*
U.S. Cl. 52—204 **10 Claims**



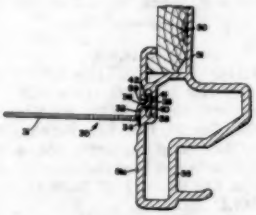
1. A window assembly including a frame which comprises:
a sash assembly mounted for sliding movement within the frame including:
a glass portion;
a top rail for receiving the glass portion, said top rail defining a central cavity;
a plastic meeting rail for receiving the glass portion, said meeting rail defining a central cavity including an extension portion extending therefrom and including means for a fastener to extend through the meeting rail to the extension portion of the central cavity;
two vertical rails for receiving the glass portion, said rails collectively encasing the glass portion; and
a first rigid structural support sized to fit within the cavity defined by the meeting rail, said support engaging the meeting rail to form an integrated structural unit and said support including fastener receiving means positioned to project into the extension portion of the cavity such that a fastener may extend through the meeting rail and engage the fastener receiving means of the support.

4,958,469

COLLAPSIBLE WINDOW FLANGE APPARATUS

David D. Plummer, Hudson, Wis., assignor to Andersen Corporation, Bayport, Minn.

Filed May 16, 1989, Ser. No. 352,355
Int. Cl.[5] E06B *1/04*
U.S. Cl. 52—213 **28 Claims**



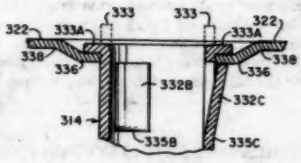
1. A detachable flange for a window or door frame of the type having a longitudinally extending retainer groove formed below an outer surface of the frame and accessible along its length through a longitudinal access port extending from the outer surface of the frame, comprising:
(a) an elongate generally planar strip member having a length as determined by the longitudinal length of the frame to which the flange is to be attached and first and second longitudinally extending edges defining therebetween the width of said strip member;
(b) a seat extension extending at an angle to the general plane of said strip member and connected thereto along the longitudinal length of the first edge of said strip member, said seat extension extending between said strip member and a third edge;
(c) attachment means forming an extension of said seat extension for detachably securing said seat extension and strip member to a window frame, said attachment means being sized and configured to matingly engage the retainer groove through the access port in a manner such that while retainably engaged by said groove, said strip member and seat extension are rotatably movable between operative and collapsed positions, when in said collapsed position said strip member lying generally parallel to that portion of the frame to which it is attached when in said operative position, said strip member projecting outwardly from said frame with said seat extension being seated against said frame; and
(d) wherein said strip member and said seat extension are configured such that their orientation relative to one another does not change in operative use.

4,958,470

ELEVATED POST ANCHOR

Chris M. Han, Fremont; Vernal V. Long, and Douglas T. Silver, both of Danville, all of Calif., assignors to Silver Metal Products, Inc., Calif.

Filed Jan. 24, 1989, Ser. No. 301,416
Int. Cl.[5] E02D 27/00
U.S. Cl. 52—296 4 Claims



1. An elevated structural support comprising

a concrete base,

a support member having an upper end and a lower end, said lower end adapted to be embedded in said concrete base,

a generally U-shaped bracket member,

a structural member adapted to be supported by said U-shaped member,

means for connecting said upper end of said support member to said generally U-shaped bracket member, said means comprising

means defining a generally circular hole in said generally U-shaped bracket member, said hole having a diameter approximately equal to the outside diameter of said support shaft,

at least one generally rectangular tab, integrally connected to said support member proximate its upper end and disposed below the top edge of said support member, said generally rectangular tab projecting radially outwardly, said tab having a top edge adapted to engage the underside of said U-shaped bracket member proximate the peripheral edge of said circular hole,

the top edge of said of said support member being deformed radially outwardly along the top surface of said U-shaped bracket member about the peripheral edge of said circular hole,

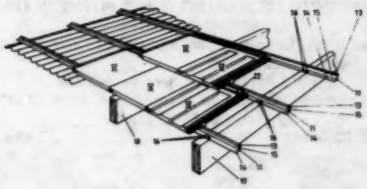
means proximate the lower end of said support member for increasing the resistance of said support member to movement in said concrete base due to the weight of said structural member on said U-shaped bracket member.

4,958,471

ROOF TILE SECURING MEANS

Richard Waddington, 75 Milan Terrace, Stirling, South Australia, 5152, Australia

Filed Sep. 15, 1989, Ser. No. 407,965
Claims priority, application Australia, Sep. 7, 1988, PJ0281
Int. Cl.[5] E04D 1/34
U.S. Cl. 52—546 11 Claims



1. Improved roof tile securing means for securing roof tiles to a roof structure comprising a plurality of elongate tile support battens each having an upstanding web, a thin upper flange extending to one side of said web, and a lower flange extending to the other side of said web, the flanges being approximately parallel, securing means for securing said tile support battens to the roof structure in spaced apart parallel relationship, wherein each said roof tile has an upper end portion supported on the upper surface of said lower flange of one tile support batten, and a lower end portion which is supported by the upper flange of an adjacent lower batten, said lower end portion overlapping the upper end portion of an adjacent lower tile,

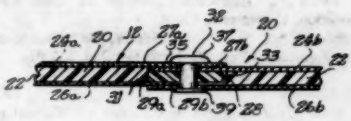
slot forming walls forming an upper flange locating slot on the underside of said roof tile near to and facing in the direction of its lower end portion, said upper flange of each said batten being arranged to snugly engage within a respective said slot, such that with the upper flange so engaged, the lower end portion of each tile is restrained against upward lifting movement, and the upper end portion of each tile being coplanar with the lower end portion thereof, and said upper end portion being free of any ribs thereat such that interlocking between the battens and the underside of the roof tiles occurs only at the lower end portion of the tiles.

4,958,472

COMPOSITE TRAILER SIDEWALL

Rodney P. Ehrlich, Monticello, Ind., assignor to Wabash National Corporation, Lafayette, Ind.

Filed May 30, 1989, Ser. No. 358,665
Int. Cl.[5] E04C 1/00, 2/32
U.S. Cl. 52—584 9 Claims



1. A sidewall for use in a trailer body or the like, said sidewall comprising at least one core member sandwiched and bonded between at least a pair of first skin members having overlapping edges and at least a pair of second skin members having overlapping edges, and joinder means abutting adjacent core members and being covered by said overlapping edges of said first and second skin members, said first and second skin members including a plurality of vertically spaced apertures adjacent each edge of said skin member and said joinder means

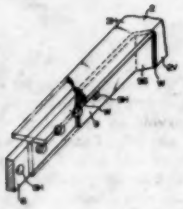
including a plurality of vertically spaced apertures, said apertures of said joinder means aligning with said apertures in said first and second skin members and said fastener means extending through said apertures in said joinder means and said first and second skin members thereby securing said skin members to said joinder means.

4,958,473

FRAME, ANGLE MEMBER FOR USE IN THE FRAME AND METHOD OF MAKING JOINT PORTION OF THE ANGEL MEMBER

Hiroumi Iyoda, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 2, 1989, Ser. No. 360,220
Claims priority, application Japan, Jun. 6, 1988, 63-137556
Int. Cl.[5] B66B *23/00*
U.S. Cl. 52—646 **13 Claims**



1. A frame including at least two frame sections each comprising upper and lower members extending longitudinally of said frame and in parallel with each other and connecting members interconnecting said upper and lower members, said upper member having a substantially inverted L-shaped cross section, said lower member having a substantially L-shaped cross section, each of said upper and lower members of each frame section including a joint portion, said frame further including means for coupling the joint portions of said upper and lower members of said frame sections together, wherein the joint portion of said upper member of each frame section has a substantially T-shaped cross section, the joint portion of said lower member of each frame section has a substantially inverted T-shaped cross section and wherein said coupling means comprise elongated and rectangular coupling members respectively attached to side faces of vertical webs of the T-shaped joint portions of the upper members of said frame sections and to side faces of vertical webs of the inverted T-shaped joint portions of said lower members of said frame sections, and means for fastening said coupling members to associated vertical webs.

4,958,474

TRUSS STRUCTURE

Adams, Louis R., Ojai, Calif., assignor to Astro Aerospace Corporation, Carpinteria, Calif.

Continuation of Ser. No. 51,743, May 18, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 317,074
Int. Cl.[5] E04H *12/18*
U.S. Cl. 52—646 **16 Claims**

1. A truss structure movable between a collapsed position and a deployed position, having:

at least one frame unit, each frame unit comprised of three rigid batten, longeron, and diagonal members and three non-rigid batten members;

the three rigid batten members being connected at their end points so as to form an equilateral triangle;

each longeron being pivotally connected at a first end to an associated rigid batten member at each point of the triangle such that the longeron pivots about an axis perpendicular to the plane defined by its deployed and collapsed longitudinal axes and such that, in the deployed position, each longeron is perpendicular to the plane defined by the triangle;

each diagonal being hinged approximately at its mid-point and being hinged at its end points to the longeron and the associated rigid batten member, with each hinge approximately parallel to those of the longeron;

the non-rigid batten members being joined at the diagonal-longitudinal junction of one frame unit to the diagonal-longitudinal junction of an adjacent frame unit; and

each non-rigid batten member having two ends and having a fully extended length, measured linearly from one end to

the other end, and a deformed length, measured linearly from one end to the other end upon deformation of the non-rigid batten member, wherein the fully extended length is greater than the deformed length;

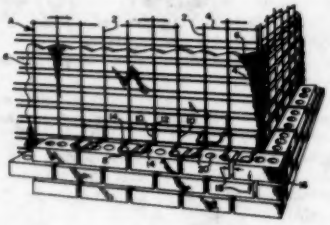
wherein each non-rigid batten member is dimensioned for allowing the non-rigid batten members to achieve their fully extended length upon the truss structure being in the collapsed position and for allowing the non-rigid batten members to deform and achieve their deformed length upon the truss structure being moved to a position intermediate the collapsed and deployed positions.

4,958,475

BRICK SUPPORTING STRUCTURES

Peter J. Pollina, 1150 Hylan Blvd., Staten Island, N.Y. 10305

Continuation of Ser. No. 54,514, May 27, 1987, Pat. No. 4,765,115. This application Aug. 18, 1988, Ser. No. 233,538
Int. Cl.[5] E04B *1/38*
U.S. Cl. 52—712 **4 Claims**



1. A brick laying form comprising:

(a) a pre-fabricated wire support structure having a shape generally corresponding to the shape of a completed masonry structure.

(b) said wire support structure including at least two longitudinally extending parallel wires or rods disposed in a preselected configuration,

(c) said wire support structure including a plurality of unequally spaced-apart transversely extending wire cross ties intersecting said longitudinally extending wires or rods,

(d) the distances between successive adjacent cross ties serving as a guide in placing bricks and mortar between

adjacent rows of bricks during fabrication of the masonry structure,

(e) a hanger connected with each cross tie which includes a generally U-shaped main body portion and a pair of spaced-apart legs extending perpendicularly from opposite ends of a U-shaped body portion and terminating as hook portions,

(f) two adjacent hangers forming an interlocked support pair connected to said wire support structure which each have a main body portion for engaging a brick therebetween from two opposite faces thereof,

(g) the leg portions of each of said hangers laying adjacent to a third intermediate side of said brick with said hook portions of one hanger being opposed to hook portions of said other of said hangers, and

(h) a resilient connecting element engaging each of said portions of said hangers tolock said hangers to said brick.

4,958,476

ADAPTIVE ARCHITECTURAL COVER PANEL SYSTEM

Rodman W. Kotter, 10815 Molony Rd., Culver City, Calif. 90230

Division of Ser. No. 174,516, Mar. 28, 1988, abandoned. This application May 19, 1989, Ser. No. 355,788

Int. Cl.[5] E04G *21/14*

U.S. Cl. 52—745 5 Claims

1. A method for covering the structural support members of an underlying structure, comprising attaching to said support members a plurality of contiguously arranged architectural cover panels of flexible material having a generally convex cross-section with corrugations formed therein extending transverse to a longitudinal axis of the panels, said corrugations enabling said cover panels to conform to the dimensions and surface curvature of the support members, said cover panels having edge portions formed along the longitudinal sides of said flexible material with corrugations formed therein oriented generally parallel to and intersecting the corrugations of said convex cross-section portion of the flexible material.

4,958,477

APPARATUS FOR THE PRODUCTION OF MEAT PRODUCTS

Bruno Winkler, Weinheim-Oberflockenbach, Fed. Rep. of Germany, assignor to Naturin-Werk Becker & Co., Weinheim/-Bergstrasse, Fed. Rep. of Germany

Division of Ser. No. 63,715, Jun. 15, 1987, Pat. No. 4,910,034, which is a continuation of Ser. No. 770,412, Aug. 28, 1985, abandoned. This application Oct. 27, 1989, Ser. No. 428,360

Claims priority, application Fed. Rep. of Germany, Aug. 28, 1984, 3431521

Int. Cl.[5] A22C *13/00*

U.S. Cl. 53—138 R 15 Claims

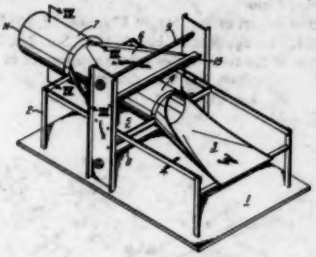
1. An apparatus for wrapping compact meat products, which comprises:

a feed tray for receiving said meat products;

a guide tube, having a first and a second end, with said first end receiving said feed tray;

a second tube which fits over said second end of said guide tube; and

upper and lower film guides respectively positioned above and below said guide tube, each of said guides tapering conically toward said second end of said guide tube with one of said film guides fitting into said second tube, and



the other of said film guides, in the form of a partial cylindrical shell, extending into said second tube.

4,958,478

APPARATUS FOR STORING AND SUPPLYING END CLOSURES FOR ENVELOPES OF CYLINDRICAL COMMODITIES

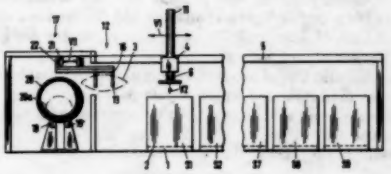
Jakob Hannen, Willich, Fed. Rep. of Germany; Josef-Franc Zajec, Velden, Netherlands, and Stephan Piesen, Krefeld, Fed. Rep. of Germany, assignors to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany

Filed Feb. 8, 1989, Ser. No. 308,548

Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803874

Int. Cl.[5] B65B *11/04*

U.S. Cl. 53—415 34 Claims



1. Apparatus for storing and manipulating different flat components, particularly disc-shaped end walls, of envelopes for substantially cylindrical objects of the type having a peripheral surface and two end faces flanking the peripheral surface, such as rolls of paper and the like, comprising a battery of depositories for different components; a positioning unit having means for maintaining discrete objects in such positions that the end faces of an object in said positioning unit are accessible; transporting means including guide means defining an elongated path extending from said maintaining means along the depositories of said battery, and conveyor means mounted for movement along said path to transport components from selected depositories of said battery toward said maintaining means, the depositories of said battery forming two rows which flank said path; and means for changing the orientation of components between said maintaining means and said depositories.

4,958,479

PACKAGE WRAPPING METHOD AND MACHINE

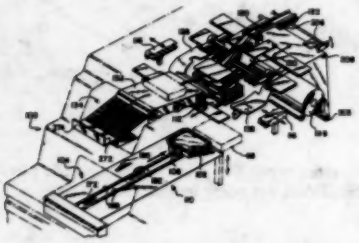
Fritz F. Treiber, Centerville, Ohio, assignor to Hobart Corporation, Troy, Ohio

Continuation-in-part of Ser. No. 96,879, Sep. 15, 1987, Pat. No. 4,813,211. This application Jan. 9, 1989, Ser. No. 295,170

The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.

Int. Cl.[5] B65B *11/18, 57/04*

U.S. Cl. 53—441 **8 Claims**



1. A method for wrapping packages in stretch film comprising the following steps:

designating the length of a package;

operating a conveyor to carry said package to an elevator of a wrapping station and to locate said package at a registration position on one side of said elevator;

gripping a free end of a continuous source of stretch film on the side of said elevator opposite to said one side and drawing said free end over said elevator to a defined position beyond said registration position;

operating side clamps to engage the lateral edges of the film over said elevator;

elevating said package into said film to stretch said film and draw any additional film required by the height of said package from said continuous source of stretch film;

moving a horizontal bar into contact with said film at a location between said package and said film source to form a loop of film and pull from said film source a second length of additional film corresponding to the designated length of said package;

cutting said film to produce a sheet of film of suitable length for the height and length of said package;

releasing said side clamps from engagement with said film, and

folding said sheet of film under said package.

4,958,480

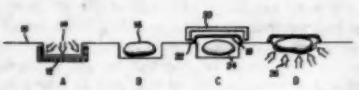
HIGH PROFILE SHRINK PACKAGE

John J. Warner, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Continuation-in-part of Ser. No. 255,875, Oct. 7, 1988, abandoned. This application Sep. 1, 1989, Ser. No. 402,273

Int. Cl.[5] B65B *11/52, 11/58, 31/02, 53/02*

U.S. Cl. 53—433 **3 Claims**



1. A method of packaging a product comprising:

(a) drawing a thermoplastic, thermoformable shrinkable bottom web into a thermoforming die to form a cavity;

(b) inserting the product into the cavity;

(c) moving the thermoformed bottom web and product to a vacuum chamber;

(d) placing a preformed tray, upside down, in the chamber on top of the web to define an unsealed package, the tray having a heat sealable thermoplastic layer adhered thereto along a surface of the tray facing the thermoformable web;

(e) sealing the tray directly to the bottom web under vacuum;

(f) shrinking the bottom web; and

(g) turning the packing right side up such that the shrunken bottom web becomes the top of the final package.

4,958,481

BOX-CORDING APPARATUS

Sam H. Kim, 43-3, Myungju-dong, Kangneung-si, Kangwon-do, Rep. of Korea

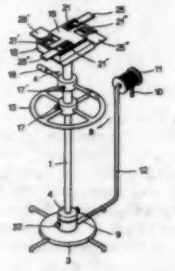
PCT No. PCT/KR88/00005, § 371 Date Oct. 18, 1988, § 102(e) Date Oct. 18, 1988, PCT Pub. No. WO88/06124, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 19, 1988, Ser. No. 264,279

Claims priority, application Rep. of Korea, Feb. 20, 1987, 1987-1974

Int. Cl.[5] B65B *13/02, 67/00*

U.S. Cl. 53—592 **6 Claims**



1. A box-cording apparatus comprising:

frame means having a base frame on which a box to be corded is loaded and support members slidably installed on said base frame;

driving means for moving said support members back and forth;

frame rotating means having a shaft fixed to said base frame, control means for the rotation of said shaft and a base for supporting said shaft; and

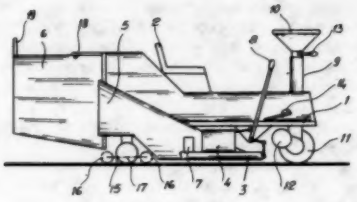
wherein said base frame comprises an upper base plate having a first set of guide channels formed thereon in four directions for slidably receiving said support member, a middle base plate having a second set of guide channels on which catching jaws are formed, and a lower base plate attached onto said middle base plate and having guide holes formed thereon through which guide pins are placed, said guide pins being connected to guide pieces which are fixed to said support members and slidably received within said second set of guide channels, the width of said second set of guide channels being a little larger than that of said first set thereof and both of said first and second sets thereof defining guide grooves for slidably receiving said guide pieces.

4,958,482

MOWING MACHINE

Teodoro Soldavini, Via Leonardo da Vinci 48D, 20062 Cassano d'Adda (Milano), Italy

Filed May 22, 1989, Ser. No. 354,926
Claims priority, application Italy, May 25, 1988, 20735 A/88
Int. Cl.[5] A01D *34/03*
U.S. Cl. 56—14.3 4 Claims



1. An improved seating-operator mowing machine comprising a frame supporting a casing having a bottom, a grass cutting assembly coupled to said bottom and an operator seat, a front steering column rotatably supporting a driven front roller and two load bearing spaced parallel rear rollers extending transversely of said mowing machine and swingably mounted about a middle axis.

4,958,483

ROPE GUIDE

Richard A. Heismann, Collierville, Tenn., assignor to The Toro Company, Minneapolis, Minn.

Continuation of Ser. No. 230,907, Aug. 11, 1988, abandoned.
This application Feb. 27, 1990, Ser. No. 489,734
Int. Cl.[5] A01D *34/67*
U.S. Cl. 56—17.5 8 Claims

1. In combination, an extruded member having a substantially C-shaped cross-section and hence a longitudinal opening in one side thereof, and a rope guide for attachment to said member, said guide comprising;

a tubular body portion having an inner wall configuration similar to the exterior wall configuration of said member to receive said member therewithin in close-fitting, sliding relation

means for selectively securing said body portion to said member, said means comprising a threaded element within said member and screw means threadedly connecting said body portion with said threaded element, said screw means passing through the opening in said member,

an arm portion extending outwardly from said body portion, and

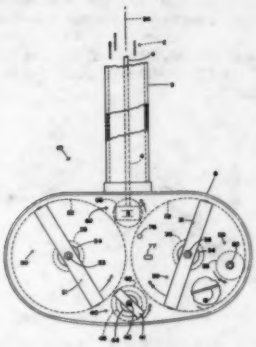
an aperture in said arm portion for receiving and guiding a rope passing therethrough.

4,958,484

VEGETATION CUTTING BLADES ASSEMBLY

Garry W. Busboom, Beatrice, Nebr., assignor to Exmark Manufacturing Company Incorporated, Beatrice, Nebr.

Filed Jul. 28, 1989, Ser. No. 386,155
Int. Cl.[5] A01D *34/68*
U.S. Cl. 56—255 3 Claims



1. In combination with vegetation cutting apparatus of the type comprising a directionally longitudinally extending driveshaft frontally actuatably connected to a gearbox mounted to a directionally transversely extending housing deck for a plurality of horizontal rotary cutting blades and further comprising a vegetation cuttings chute communicating with a medial portion of and extending horizontally rearwardly from said housing deck along a directionally longitudinal central-axis, a housed cutting blades assembly rotatably actuated from said gearbox and arrayed to cut a continuously directionally transversely extending swath of growing vegetation, said improvement comprising:

(A) a rightward cutter blade centrally attached to a vertical rightward shaft rotatably secured to a rightwardly transversely offset portion of said housing deck and carrying a rightward sheave, the periphery of said rightward cutter blade circumscribing a rightward circle located predominately transversely rightwardly of said longitudinal central-axis;

(B) a leftward cutter blade centrally attached to a vertical leftward shaft rotatably secured to a leftwardly transversely offset portion of said housing deck and transversely aligned with said rightward shaft, said leftward shaft carrying a leftward sheave, the periphery of said leftward cutter blade circumscribing a leftward circle located predominately transversely leftwardly of said longitudinal central-axis and in adjacent non-intersecting relationship with said rightward circle, the diameter of said leftward circle being substantially equal to that for said rightward circle;

(C) a medial cutter blade centrally attached to a vertical medial shaft rotatably secured to a central forward portion of said housing deck and carrying a medial sheave, the periphery of said medial cutter blade circumscribing a medial circle located at said longitudinal central-axis and being disposed mainly forwardly of and in adjacent non-intersecting relationship with said rightward and leftward circles, the diameter for said medial circle not exceeding one-half that of said rightward circle;

(D) a reversing sheave that is located forwardly from and transversely offset from said transversely aligned rightward and leftward shafts; and

(E) endless belt type transmission means emanatating from a gearbox sheave and trained with each of said sheaves, and so as to rotate the rightward and leftward cutter blades in opposite angular directions and respectively angularly

toward said longitudinally horizontally rearwardly extending cuttings chute.

4,958,485

CORESPUN YARN FOR FIRE RESISTANT SAFETY APPAREL

Terry G. Montgomery, Matthews, N.C., and William G. Martin, Fort Mill, S.C., assignors to Springs Industries, Inc., Fort Mill, S.C.

Filed Dec. 22, 1988, Ser. No. 288,682
Int. Cl.[5] D02G *3/02, 3/04, 3/36*
U.S. Cl. 57—210 **8 Claims**

1. A corespun yarn for forming fire resistant safety apparel comprising

a core of high temperature resistant staple fibers selected from the group consisting of aramid fibers and polybenzimidazole fibers,

a core wrapper of low temperature resistant staple fibers surrounding and covering said core,

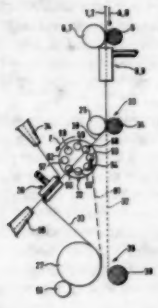
an outer sheath of low temperature resistant staple fibers surrounding and covering said core wrapper, and wherein the fibers of said core and said core wrapper extend primarily in an axial or longitudinal direction along said corespun yarn, and wherein said fibers of said outer sheath extend primarily in a circumferential direction around said corespun yarn.

4,958,486

PROCESS AND AN ARRANGEMENT FOR PIECING AN AIR-SPUN YARN

Fritz Stahlecker, Bad Überkingen, Fed. Rep. of Germany, assignor to Hans Stahlecker, Fed. Rep. of Germany, a part interest

Filed May 11, 1989, Ser. No. 350,520
Claims priority, application Fed. Rep. of Germany, May 20, 1988, 3817222
Int. Cl.[5] D01H *1/15, 15/00*
U.S. Cl. 57—261 **17 Claims**



1. Arrangement for piecing air-spun yarn supplied by a spinning unit with a previously spun yarn end withdrawn from a partially wound spool package, comprising:

yarn piecing means for piecing yarn ends together,

new yarn feeding means for feeding a newly spun yarn end to the yarn piecing means,

old yarn feeding means for feeding a previously spun yarn end from a partially wound spool package to the yarn piecing means,

yarn storage means for storing the newly spun yarn supplied continuously by a spinning unit during the piecing operation, said yarn storage means including means for forming a plurality of yarn loops therein,

and spool package drive control means for driving the spool package at higher than normal spinning operating speeds for a short interval after the piecing operation so as to wind up the excessive length of the yarn stored in the yarn storage means,

wherein the yarn storage means contains several suction pipes which can be activated successively,

wherein the suction pipes are mounted in a rotatable holding device which is rotationally driven by a turning drive which operates in a timed manner, and

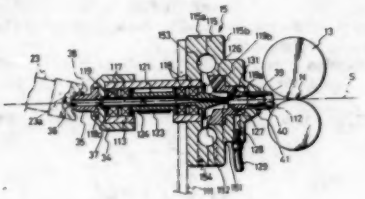
wherein control means are provided for activating the suction pipes and for controlling the turning drive.

4,958,487

APPARATUS FOR PRODUCING SPUN YARN

Buro Suganuma, Nagaokakyo; Shinichi Nishimura, Ohtsu, and Akihiko Takeshita, Kyoto, all of Japan, assignors to Murata Kikai Kabushiki Kaisha, Kyoto, Japan

Filed Oct. 28, 1988, Ser. No. 263,710
Claims priority, application Japan, Oct. 29, 1987, 62-274452; Oct. 29, 1987, 62-274453
Int. Cl.[5] D01H *1/115*
U.S. Cl. 57—328 **15 Claims**



1. An apparatus for producing a spun yarn, comprising:

a rotary pipe having an entrance and an exit and defining a sliver path for passing a sliver therethrough,

a rotational support for rotatably supporting the rotary pipe,

a rotary plate integral with the rotary pipe and spaced from the entrance of the rotary pipe,

a casing for covering the rotary pipe and the rotary plate,

a guide path for introducing and guiding a sliver to the entrance of the rotary pipe,

a jetting nozzle opening onto the entrance of the rotary pipe, and

a pair of dam members disposed in the guide path for introducing a substantially flattened, untwisted sliver to the entrance of the rotary pipe, each dam member being disposed on an opposite side of the guide path and at a different distance from the entrance of the rotary pipe,

wherein the guide path defines an inner diameter,

wherein each dam member has a height which is smaller than one-half the inner diameter of the guide path, and

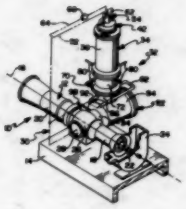
wherein the dam members define a slit-shaped sliver path within the guide path.

4,958,488

COMBUSTION SYSTEM

Colin Wilkes, Lebanon; Hukam C. Mongia, Carmel, and Peter C. Tramm, Indianapolis, all of Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Apr. 17, 1989, Ser. No. 339,449
Int. Cl.[5] F02C 7/00
U.S. Cl. 60—39.55 2 Claims



1. In combination with a source of compressed air and a source of one of a gaseous and a liquid fuel,

a combustion system comprising:

a rich zone combustor, means connecting said rich zone combustor to said source of compressed air and to said source of one of said gaseous and said liquid fuel,

said fuel being burned in a primary portion of said compressed air in said rich zone combustor at an equivalence ratio exceeding 1 and at on the order of about 2800 degrees F. whereby rapid formation of oxides of nitrogen is inhibited and a continuous stream of combustible hot gas issues from said rich zone combustor,

a quench stage connected to said rich zone combustor having a throat portion therein receiving said continuous stream of combustible hot gases,

means on said quench stage defining a curtain of one of water and steam stretching across said throat portion and intercepting all of said continuous stream of combustible hot gas to reduce the temperature of said continuous stream of combustible hot gas from on the order of about 2800 degrees F. entering said quench stage to on the order of about 1900 degrees F. exiting said quench stage,

a lean zone combustor connected to said quench stage receiving therefrom the total outflow of said quenched combustible hot gas and to said source of compressed air operative to mix said quenched combustible hot gas and a secondary portion of said compressed air to initiate spontaneous combustion of said quenched combustible hot gas in said lean zone combustor at an equivalent ratio of less than 1,

said spontaneous combustion generating a continuous stream of non-combustible hot gas motive fluid at a temperature not exceeding about 3000° F., and

duct means connected to said lean zone combustor for transporting said non-combustible hot gas motive fluid to a consuming device.

4,958,489

MEANS FOR CONTROLLING AUGMENTOR LINER COOLANT FLOW PRESSURE IN A MIXED FLOW, VARIABLE CYCLE GAS TURBINE ENGINE

John R. Simmons, Montgomery, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Division of Ser. No. 57,642, Jun. 8, 1987, Pat. No. 4,813,229, which is a continuation of Ser. No. 708,181, Mar. 4, 1985, abandoned. This application Sep. 9, 1988, Ser. No. 242,238
Int. Cl.[5] F02K 3/075, 3/10
U.S. Cl. 60—226.3 16 Claims

1. A gas turbine engine comprising:

a core engine for generating a gas flow;

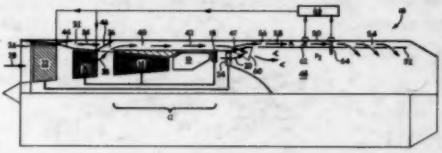
a front fan for pressurizing air;

an aft fan for further pressurizing air discharged from the front fan;

a bypass duct including a first bypass duct inlet which directs a first bypass airflow around the aft fan into said bypass duct, a second bypass duct inlet which directs a second bypass airflow from the aft fan into said bypass duct;

an augmentor aft of said core engine;

an exhaust duct surrounding said augmentor;



a cooling liner positioned within said exhaust duct so as to form a cooling plenum therebetween;

means for receiving a portion of said bypass flow into said plenum;

means for mixing said bypass flow with said gas flow;

a first sensing means for sensing a control pressure in said exhaust duct; and

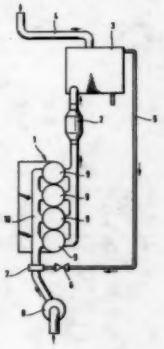
a varying means for modulating the flow pressure in said bypass duct as a function of at least said control pressure.

4,958,490

METHOD FOR REDUCING NITRIC OXIDE EMISSIONS IN EXHAUST GASES FROM DIESEL ENGINES

Harri J. Harjunpää, Outokumpu, Finland, assignor to Outokumpu Oy, Helsinki, Finland

Continuation of Ser. No. 129,451, Dec. 7, 1987, abandoned. This application Aug. 14, 1989, Ser. No. 393,125
Int. Cl.[5] F02M 25/06
U.S. Cl. 60—274 3 Claims



1. A method for reducing the nitric oxide emissions of exhaust gases from a diesel engine by additions of water into an engine combustion chamber of said diesel engine and by recirculating exhaust gases, comprising conducting exhaust gases created in the engine into a wet cleaner for washing and cooling the gases, returning washed and cooled gases from the wet cleaner to a suction system of the engine, and maintaining constant the relationship by volume between a total gas volume of the engine and the volume of recirculated exhaust gases.

4,958,491

ARRANGEMENT FOR HOLDING A CATALYST IN A HOUSING IN AN EXHAUST SYSTEM OF A LIQUID FUEL-OPERATED MOTOR

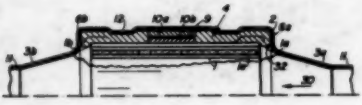
Georg Wirth, Kirchheim/Teck, and Siegfried Wirth, Esslingen, both of Fed. Rep. of Germany, assignors to J. Eberspächer, Esslingen, Fed. Rep. of Germany

Filed Mar. 28, 1988, Ser. No. 174,121

Claims priority, application Fed. Rep. of Germany, Mar. 28, 1987, 3710299

Int. Cl.[5] F01N *3/28*

U.S. Cl. 60—299 13 Claims



1. A device for holding a monolith catalyst in a housing, comprising a knitted mass of metallic material surrounding the catalyst, said knitted mass including areas of obliquely deformed impressions formed in said areas on each side of said mass and including a sealing strip portion between said deformed areas, said sealing strip portion being free of deformed impressions.

4,958,492

METHOD OF CONTROLLING CLUTCH OPERATION FOR A VEHICLE AND METHOD OF DETERMINING CLUTCH ENGAGEMENT COMPLETION

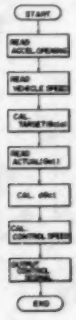
Kazuya Maki, Aichi; Yoshikazu Ishikawa; Kouji Yamaguchi, both of Saitama, and Koji Sasajima, Tokyo, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 21, 1988, Ser. No. 247,410

Claims priority, application Japan, Sep. 21, 1987, 62-236812; Sep. 21, 1987, 62-236806; Sep. 21, 1987, 62-236811; Oct. 12, 1987, 62-256717; Oct. 14, 1987, 62-259224

Int. Cl.[5] F16H *61/46*

U.S. Cl. 60—327 9 Claims



1. A method of controlling clutch operation, for a vehicle having a transmission which transmits engine power to wheels and clutch means which controls an actual power transmitted through said transmission comprising the steps of:

setting a reference capacity of said clutch means corresponding to a parameter representing vehicle speed and a parameter representing a driver's intention of acceleration;

and controlling said actual power transmission through said transmission by adjusting the capacity of said clutch means so as to coincide with said reference capacity.

4,958,493

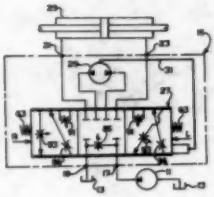
OPEN-CENTER STEERING CONTROL UNIT WITH FLOW AMPLIFICATION

Herman P. Schutten, Bayside, Wis.; Dwight B. Stephenson, Savage, and Donald M. Haarstad, Chaska, both of Minn., assignors to Eaton Corporation, Cleveland, Ohio

Continuation-in-part of Ser. No. 254,067, Oct. 6, 1988, Pat. No. 4,862,690. This application Mar. 20, 1989, Ser. No. 325,721

Int. Cl.[5] F16D *31/02*

U.S. Cl. 60—384 16 Claims



1. An open-center controller operable to control the flow of fluid from a source of fluid to a fluid pressure operated device; said controller being of the type including housing means defining a fluid inlet port for connection to the source of fluid, a return port for connection to a reservoir, and first and second control fluid ports for connection to the fluid pressure operated device; valve means disposed in said housing means and defining a neutral position and a first operating position; said housing means and said valve means cooperating to define a neutral fluid path communicating between said inlet port and said return port, and including a variable neutral orifice having its maximum flow area when said valve means is in said neutral position, and a decreasing flow area as said valve means is displaced from said neutral position toward said first operating position; said housing means and said valve means cooperating to define a main fluid path communicating between said inlet port and said first control fluid port, and between said second control fluid port and said return port when said valve means is in said first operating position; fluid actuated means for imparting follow-up movement to said valve means proportional to the volume of fluid flow through said fluid actuated means, said fluid actuated means being disposed in series flow relationship in said main fluid path between said inlet port and said first control fluid port; said main fluid path including a first, fixed flow control orifice disposed between said inlet port and said fluid actuated means, a second, variable flow control orifice disposed between said first flow control orifice and said fluid actuated means, and a third, variable flow control orifice disposed between said fluid actuated means and said first control fluid port, said second and third flow control orifices having minimum flow areas when said valve means is in said neutral position, and increasing flow areas as said valve means is displaced from said neutral position toward said first operating position; characterized by:

(a) said housing means and said valve means cooperating to define an amplification fluid path in parallel with said main fluid path, said amplification fluid path being in fluid communication with said main fluid path at a first location disposed between said fluid inlet port and said first, fixed flow control orifice, and at a second location disposed between said third, variable flow control orifice and said first control fluid port;

(b) said amplification fluid path including a variable amplification orifice having its minimum flow area when said valve means is in said neutral position, and an increasing flow area as said valve means is displaced from said neutral position toward said first operating position; and

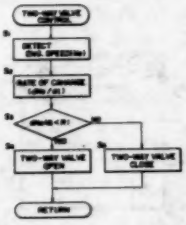
(c) said variable amplification orifice begins to open at substantially the same time as said second and third, variable flow control orifices begin to open.

4,958,494

CONTROLLER FOR CONTINUOUSLY VARIABLE SPEED TRANSMISSION

Kazuya Maki, Aichi, and Kouji Yamaguchi, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 252,642
Claims priority, application Japan, Oct. 14, 1987, 62-259226
Int. Cl.[5] F16H 61/40
U.S. Cl. 60—468 24 Claims



8. A controller in a continuously variable transmission having a hydraulic pump and a hydraulic motor interconnected by a closed hydraulic circuit, said closed hydraulic circuit having a first hydraulic line connecting an input port of said hydraulic motor with an outlet port of said hydraulic pump and a second hydraulic line connecting an outlet port of said hydraulic motor with an input port of said hydraulic pump, and an engine for driving said hydraulic pump, comprising,

a bypass line communicating with said first hydraulic line and with said second hydraulic line, and

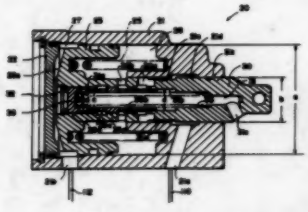
control means for selectively opening said bypass line when the reduction rate of the engine speed of said engine exceeds a given value.

4,958,495

HYDRAULIC DIFFERENTIAL CYLINDER

Kouji Yamaguchi, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,078
Claims priority, application Japan, Nov. 5, 1987, 62-169360[U]
Int. Cl.[5] F15B 13/042
U.S. Cl. 60—468 12 Claims



1. A hydraulic differential cylinder comprising a cylinder, a piston slidably fitted in a cylinder chamber defined in said cylinder, a piston rod with two ends, one end of the piston rod being coupled to said piston and the other end of the piston rod projecting out of said cylinder, and an inner valve disposed in said piston rod, said cylinder chamber being divided by said piston into a rod-side cylinder chamber in which said piston rod is disposed and a head-side cylinder chamber into which a piston head surface of said piston faces, said rod-side cylinder chamber being connected via said inner valve to a constant hydraulic pressure source for supplying working fluid of a substantially constant pressure, said head-side cylinder chamber being connected to a contol hydraulic pressure source for supplying working fluid of a controlled pressure which is lower than said constant pressure, said inner valve being actuated based on a hydraulic pressure in said head-side cylinder chamber,

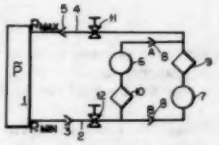
wherein, said inner valve is opened to connect said constant hydraulic pressure source to said rod-side cylinder chamber when the controlled pressure supplied in said head-side cylinder chamber is lower than a critical hydraulic pressure, and said inner valve is closed to shut off the supply of fluid from said constant hydraulic pressure source to said rod-side cylinder chamber and to connect said rod-side cylinder chamber with a drain when the controlled pressure supplied in said head-side cylinder chamber is higher than said critical hydraulic pressure.

4,958,496

MULTI-BOTTLE, NO COMPRESSOR, MEAN PRESSURE CONTROL SYSTEM FOR A STIRLING ENGINE

John A. Corey, Melrose, N.Y., assignor to Mechanical Technology Incorporated, Latham, N.Y.

Filed Jan. 4, 1990, Ser. No. 460,826
Int. Cl.[5] F02G 1/04
U.S. Cl. 60—521 4 Claims



1. A mean pressure control system for a Stirling engine, comprising:

at least one high pressure tank;

at least one low pressure tank;

said high pressure tank and said low pressure tank each including a check valve to prevent backflow of gas from one tank to the other during operation;

at least one inlet regulator for each said low pressure tank adapted to open when said engine has a maximum pressure level lower than that of the next higher pressure tank;

at least one outlet regulator for each said high pressure tank adapted to open when next lower pressure tank has a minimum pressure level higher than that of said engine;

a maximum pressure supply line including a first valve connecting said engine to said high pressure tank and to said inlet regulator;

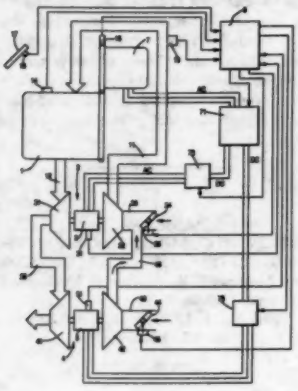
a minimum pressure supply line including a second valve connecting said engine to said low pressure tank valve and to said outlet regulator so that when said first valve is open gas is transferred through said maximum pressure supply line from said engine to said high pressure tank until said engine pressure level drops below that of said high pressure tank thereby opening said inlet regulators so that gas is then transferred from said engine to said low pressure tank; and wherein said second valve is opened gas is supplied through said minimum pressure supply line from said low pressure tank to said engine until said engine pressure level is above that of said low pressure tank thereby opening said outlet regulator so that gas is transferred through said minimum pressure supply line from said high pressure tank to said engine.

4,958,497

DRIVE SYSTEM FOR TURBOCHARGERS WITH ROTARY ELECTRIC MACHINES

Hideo Kawamura, Samukawa, Japan, assignor to Isuzu Ceramics Research Institute Co., Ltd., Kanagawa, Japan

Filed Jul. 17, 1989, Ser. No. 380,316
Claims priority, application Japan, Jul. 18, 1988, 63-178722
Int. Cl.[5] F02B 37/04
U.S. Cl. 60—608 6 Claims



1. A turbocharger drive system combined with an internal combustion engine, comprising:
- means for detecting the load on the internal combustion engine;
- means for detecting the rotational speed of the internal combustion engine;
- means for detecting the boost pressure of the internal combustion engine;
- means for storing the boost pressure corresponding to the detected load on the internal combustion engine;
- a plurality of turbochargers having series-connected exhaust turbines, respectively, and series-connected compressors, respectively;
- a plurality of rotary electric machines mounted respectively on rotatable shafts of said turbochargers;
- a single rotary electric machine drivable by an output shaft of the internal combustion engine;
- means for driving said single rotary electric machine as an electric generator;
- means for calculating the difference between the boost pressure corresponding to the detected load and the detected boost pressure;
- means for driving said plurality of rotary electric machines as electric motors successively from the rotary electric machine combined with the turbocharger closest to the internal combustion engine as said difference increases when said detected boost pressure is lower than said boost pressure corresponding to said detected load; and
- means for supplying electric power from said electric generator to said motors.

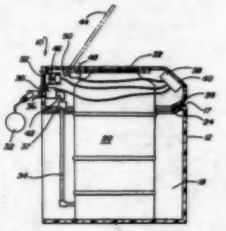
4,958,498

CRYOGENIC STORAGE DEVICE

James L. Brothers, Warren, Mich., assignor to Custom Biogenic Systems, Warren, Mich.

Filed Jan. 23, 1990, Ser. No. 468,851
Int. Cl.[5] F25B 19/00
U.S. Cl. 62—51.1 5 Claims

1. A cryogenic storage device comprising:
- a housing having a lower part and an upper part, said lower housing part having an interior chamber and an open upper end,
- a cryogenic storage tank insertable into said interior chamber of said lower housing part so that an upper end of said storage tank is adjacent said upper end of said lower housing part and adjacent said upper housing part said storage tank having a fill line,
- means for detachably securing said housing parts together so that said upper housing part overlies said storage tank,



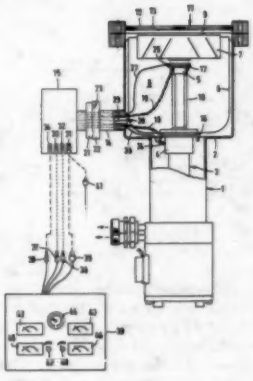
- valve means contained in said upper housing part, said valve means adapted to be fluidly connected between an external source of coolant and said storage tank fill line,
- circuit means for controlling actuation of said valve means, said circuit means being contained within said upper housing part so that, upon detachment of said valve means from said fill line, said upper housing part is detachable from said lower housing part and said storage tank.

4,958,499

METHOD AND APPARATUS FOR CHECKING THE OPERATION OF A REFRIGERATOR-OPERATED CRYOGENIC PUMP

Hans-Ulrich Haefner, Cologne; Manfred Klotz, Kahl/Main, and Wilhelm Strasser, Bergisch Gladbach, all of Fed. Rep. of Germany, assignors to Leybold Aktiengesellschaft, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,670
Claims priority, application European Pat. Off., Apr. 13, 1988, 88105857
Int. Cl.[5] B01D 8/00
U.S. Cl. 62—55.5 11 Claims



1. A method for checking the operation of a refrigerator-operated cryogenic pump having a cold head with at least one refrigerating unit that is equipped with a pump surface, com-

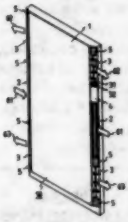
prising the steps of: interrogating various data of the cryogenic pump under different operating conditions; and comparing the interrogated data to rated data, at least one of the interrogated data being a net refrigerating power of the refrigerating unit which is measured and compared to a rated value.

4,958,500

AIR CONDITIONER AND AIR CONDITIONING METHOD

Shigeaki Kuroda; Kensaku Oguni, both of Shimizu; Takao Senshu, Shizuoka; Hirokiyo Terada, Shizuoka; Makoto Nagai, Yaizu, and Masamichi Hanada, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 340,684
Int. Cl.[5] F25D *17/06*
U.S. Cl. 62—89 **10 Claims**



9. An air conditioning method, the method comprising the steps of:

during a cooling operation, drawing air into an air conditioner means from a lower part on each side thereof, cooling the air, and discharging the cooled air forwardly slantwise from and upper part of the air conditioner means and on each side thereof; and

during a heating operation, drawing the air into the air conditioner means from and upper part thereof and on each side thereof, heating the air, and discharging the heated air forwardly slantwise from the lower part of the air conditioner means and on each side thereof.

4,958,501

REFRIGERANT CHARGING APPARATUS

Genichi Nakano; Kaho; Sadao Higami, Ikeda, and Yasutaka Hashimoto, Yawata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd.; Fukuhou Teisan Co., Ltd. and Dengen Co., Ltd., all of Osaka, Japan

Filed Jul. 11, 1989, Ser. No. 378,282
Claims priority, application Japan, Jul. 11, 1988, 63-172150
Int. Cl.[5] F25B *45/00*
U.S. Cl. 62—125 **8 Claims**

1. A refrigerant charging apparatus comprising:

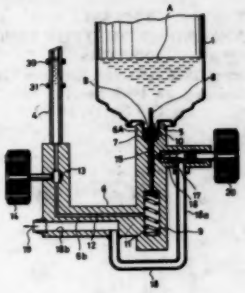
a frame part for holding a refrigerant can including a refrigerant therein;

a conduit which includes a first can-opening part and has at least first and second inner passages therethrough, said first can-opening part including a first can-opener for opening one end of said refrigerant can and making communication between said refrigerant can and said inner passages;

a second can-opening part which has an inner passage therethrough and includes a second can-opener for opening the other end of said refrigerant can and making communication between said refrigerant can and said inner passage; and

a level indicator, one end of which is communicated with one of said inner passages of the conduit and the other end of which is communicated with said inner passage of the second can-opening part, for indicating a level of said refrigerant, wherein

the first inner passage leads said refrigerant to an outlet from the conduit, and the second inner passage leads said refrigerant to said indicator, wherein



said first inner passage has an expansion part for expanding said refrigerant, said expansion part being disposed away from said second inner passage, while after the expansion part the first inner passage is disposed near said second inner passage.

4,958,502

CONTROLLER FOR A REFRIGERATION UNIT

Shinji Satoh; Kanji Isomichi; Hiroshi Ogawa; Toshio Yamashita, and Nobuhiro Funahashi, all of Aichi, Japan, assignors to Mitsubishi Jukogyo K.K., Tokyo, Japan

Continuation of Ser. No. 293,814, Jan. 5, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 421,299
Claims priority, application Japan, Jan. 5, 1988, 63-500
Int. Cl.[5] F25B *49/00*
U.S. Cl. 62—126 **3 Claims**

1. A controller of a refrigerating unit which controls the refrigerating unit so that a temperature detected by controlled temperature detection means is equal to a setting temperature, comprising means for storing the temperature detected by said detection means, a card data input-output unit for reading data from a card and writing data in the card, card data reading means for reading the card data from said input-output unit, means for discriminating whether the card is a setting card or a recording card on the basis of the card data read by said reading means, setting temperature decision means for deciding the setting temperature on the basis of the card data when said discriminating means discriminates that the card is the

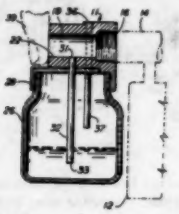
setting card, and card data writing means for reading the data stored in said storing means and writing the data in the recording card through said card data input-output unit when said discriminating means discriminates that the card is the recording card.

4,958,503

GAS DETECTOR AND METHOD FOR REFRIGERATION SYSTEMS

Mark S. Thompson, 1923 Jefferson, Redwood City, Calif. 94061

Filed Aug. 30, 1989, Ser. No. 400,473
Int. Cl.[5] G01F *13/00*
U.S. Cl. 62—129 **8 Claims**



1. In a device for detecting the presence of gas in a system evacuated by a vacuum pump: a body having a main passageway with an inlet opening adapted for connection to an exhaust outlet of the vacuum pump and a discharge opening through which exhaust from the pump is normally discharged, said main passageway being of substantially the same cross-sectional dimension as the exhaust outlet of the vacuum pump, a reservoir of liquid in which bubbling can be observed, and a second passageway of substantially smaller cross-sectional dimension than the main passageway extending between the main passageway and a position in the liquid below the surface of the liquid, the discharge opening of the main passageway being adapted to be blocked manually by a person using the device to temporarily divert the exhaust from the vacuum pump through the second passageway and the liquid to produce bubbling in the liquid in the event that gas is present in the exhaust.

4,958,504

AIR CONDITIONING APPARATUS FOR USE IN AUTOMOBILE

Toru Ichikawa, Kusatsu; Hideo Nishihata; Nobuo Kagoroku, both of Otsu, and Shotarou Ito, Shiga, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 16, 1989, Ser. No. 368,997
Claims priority, application Japan, Jan. 17, 1988, 63-150726
Int. Cl.[5] B60H *1/32*
U.S. Cl. 62—244 **7 Claims**

1. An air conditioning apparatus for an automobile, comprising:

an upper casing and a lower casing, said casings being assembled together and having a downstream end portion with a discharge port therein and an upstream end portion with an intake port therein;

said lower casing having: a horizontal cross-flow fan rotatably mounted therein between the ends thereof and for rotation around a horizontal axis transversely of the direction from the intake port to the discharge port and for receiving air through a portion of the outer periphery thereof facing the upstream end portion and discharging the air, after it has passed through said fan, out of the other side of the fan,

a lower diffuser extending from said fan to the discharge port,

a first stabilizer provided below said fan and on the side thereof toward said lower diffuser,

a second stabilizer provided below said fan and on the side thereof toward said upstream end portion, said first and second stabilizers defining between them a recessed portion open toward said fan;

said upper casing having a downstream guide having a curved surface having a center of the radius of curvature to the side of said fan and extending from said fan toward said discharge port, and

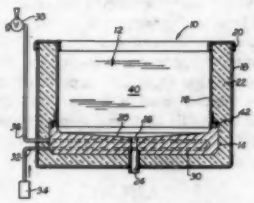
an upper diffuser forming a continuation of said downstream guide and extending on an extension line of said downstream guide to said discharge port and, together with said lower diffuser, defining a discharge passage from said fan to said discharge port which is gradually divergent toward said discharge port.

4,958,505

ICE COOLED BEVERAGE DISPENSER AND METHOD OF MAKING SAME

Craig A. Swanson, San Antonio, Tex., assignor to Schneider Metal Manufacturing Co., Mason City, Iowa

Filed Apr. 12, 1988, Ser. No. 180,513
Int. Cl.[5] B67D *5/62*
U.S. Cl. 62—398 **15 Claims**



1. An ice cooled beverage dispenser comprising

(a) a cast metal cold plate having an upper surface for support of ice thereon in thermal exchange relationship, and at least one beverage coil through the plate, said coil having an inlet connectible to a source of beverage and an outlet connectible to a dispensing valve;

(b) a tubular liner mounted to said cold plate and extending upright therefrom, the interior surface of said liner and the upper surface of the cold plate jointly forming an ice bin atop of the cold plate;

(c) an upright cold plate rim around the perimeter of the cold plate upper surface and around the outside of a bottom edge of the liner, said rim being spaced upward of said upper surface;

(d) a generally L-shaped bracket having an upright flange fastened to the outside of the liner adjacent to said bottom edge, and an outboard flange extending outward from the liner; and

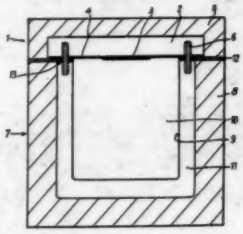
(e) a plurality of spaced apart fasteners outside of said liner and through said outboard flange and into said upright rim, said fasteners securing said outboard flange to said rim, and thereby securing said liner bottom edge within said rim.

4,958,506

CONTAINER FOR TRANSPORTING GRAFTS

Jacques R. J. Guilhem, 28 rue du Commandant Henry Vesco, 78 310 Sainte-Adresse, and Roger L. L. Wengler, 37 rue Mac Orlan, 76 600 Le Havre, both of France

Filed Mar. 6, 1989, Ser. No. 319,294
Claims priority, application France, Mar. 7, 1988, 88 02845
Int. Cl.[5] F25D 3/08
U.S. Cl. 62—457.2 15 Claims



1. A container for transporting grafts at 4° C. comprising:
a vessel;
a lid movable between a vessel-closing position and a vessel-opening position;
insulating means for thermally insulating the vessel and lid from an exterior medium;
means for defining a peripheral volume of water in the vessel including a layer located in an upper part of the volume of water;
a thermal source at a constant temperature below 4° C. and superjacent the layer of water; and
a thermal exchange located in an upper part of the container for providing a thermal exchange between the thermal source and the layer of water to maintain the volume of water at substantially 4° C.

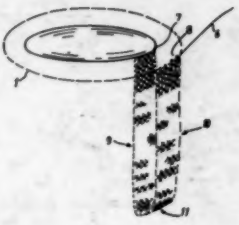
4,958,507

PROCESS FOR MAKING SOCKS

Jacky Allaire, Vailly, and Wasil Kozlowskyj, Saint Andre Les Vergers, both of France, assignors to Devanlay, Troyes, France

Filed Nov. 21, 1988, Ser. No. 273,804
Claims priority, application France, Nov. 19, 1987, 87 16027
Int. Cl.[5] D04B 9/56
U.S. Cl. 66—19 2 Claims

1. A process for making a sock having two layers on a monocylinder circular knitting machine having a central transfer plate, a needle cylinder disposed outside of and around said transfer plate, said needle cylinder comprising a plurality of knitting needles, said process comprising the following successive steps:
(a) knitting a first course of yarn corresponding to the end of the first layer of said sock;
(b) transferring said first course of yarn to said central transfer plate where said first course of yarn is maintained in standby;
(c) using said knitting needles to knit additional courses of yarn while said first course continues to be maintained in standby by said central transfer plate, said additional courses representing, successively, the foot, heel and top portions of the inner layer of said sock and thereafter, the top, heel and foot portions of the outer layer of said sock, whereby during said knitting, said additional courses of yarn will hang down from said central transfer plate and said needle cylinder;
(d) transferring said first course of yarn to said plurality of knitting needles and using said knitting needles to joint together said inner and outer layers, whereby the space between said inner and outer layers of said sock is closed off at a point corresponding to the tip of said sock;
(e) using said plurality of needles to knit additional courses of yarn, said additional courses of yarn providing a single cylindrical terminal layer extending said inner and outer layers, said terminal layer corresponding to the tip of said sock; and
(f) removing said piece of cylindrical knitted material from said monocylinder circular knitting machine and connecting together said terminal layer whereby the tip of said sock is closed.



4,958,508

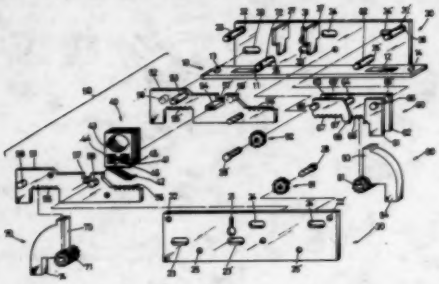
DOUBLE HOOK-BOLT MORTISE LOCK

Emily M. Y. Lin, No. 112, Sze Chuan Rd., Sec. 1, Panchiao City, Taipei Hsien, Taiwan

Filed Oct. 30, 1989, Ser. No. 428,982
Int. Cl.[5] E05B 25/02
U.S. Cl. 70—352 7 Claims

1. A lock comprising a hollow casing having two spaced slots (11 and 12) therein; separate lock bolts (70 or 80) swingably mounted within the casing adjacent the two slots for movement between retracted positions located entirely within the casing and operating positions extending through the associated slots; a tumbler plate assembly (40) centrally located within said casing between said slots; said tumbler plate assembly comprising a number of individual plates slidably arranged within the casing for movement to a depressed position in response to insertion of a key through the plate assembly; a first bolt actuator (50) slidably arranged within the casing for rectilinear movement transversely across the motion path of the tumbler plate assembly; said first actuator having a notch means (57) therein adapted to engage a key inserted into the

lock casing, whereby key rotation is then effective to move said first actuator; said first actuator having a drive connection (55,71) with one of the lock bolts; a second bolt actuator (60) slidably arranged within the casing for rectilinear movement transverse to the motion path of the tumbler plate assembly; said second actuator having a second drive connection (68,81)



with the other lock bolt; rotary pinion gear means (91,92) within said casing; first rock means (56) carried on said first actuator in meshed engagement with said pinion gear means; and second rock means (67) carried on said second actuator in meshed engagement with said pinion gear means, whereby said first actuator serves as a drive means for the second actuator.

4,958,509

ROLLING METHOD FOR PARALLEL-FLANGE STEEL SHAPES

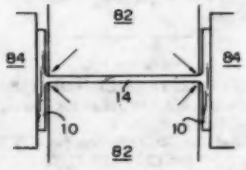
Yoshiaki Kusaba, Kobe; Hiroyuki Matoba, and Tsuneo Yamada, both of Ibaragi, all of Japan, assignors to Sumitomo Metal Industries, Ltd., Osaka, Japan

Filed Sep. 19, 1989, Ser. No. 409,303

Claims priority, application Japan, Sep. 20, 1988, 63-235388

Int. Cl.[5] B21B *1/08*

U.S. Cl. 72—225 **19 Claims**



1. A rolling method for parallel-flange steel shapes comprising:

rough rolling a rolling material in a breakdown mill so as to form a web and two flanges connected to ends of the web;

performing intermediate rolling so as to reduce the flanges to substantially their final dimensions; and

performing finishing rolling in universal finishing mill so as to reduce web height between outer surfaces of the flanges by rolling the outer surfaces of the flanges with vertical rolls without inner surfaces of the flanges contacting lateral surfaces of horizontal rolls of the universal finishing mill.

4,958,510

FASTENER INSTALLATION APPARATUS

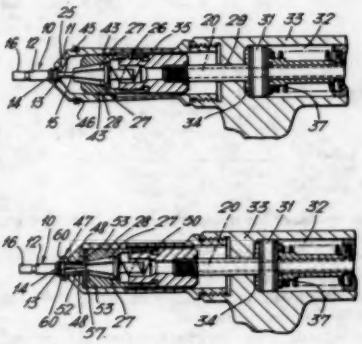
Keith Denham, Welwyn Garden City; Donald S. Savage, St. Albans, and John A. Shortland, Welwyn Garden City, all of England, assignors to Avdel Systems Limited, Welwyn Garden City, England

Filed Jul. 26, 1989, Ser. No. 385,064

Claims priority, application United Kingdom, Jul. 29, 1988, 8818078

Int. Cl.[5] B21J *15/20*

U.S. Cl. 72—391.4 **14 Claims**



1. Fastener installation apparatus for installing a fastener of the type comprising a first member, a second member, and a third member, the fastener being installed by the application of force to the second member relative to the first member, the reaction to the force on the second member being applied to the first member through the third member, the third member being free from the first and second members on completion of the installation of the fastener;

which fastener installation apparatus comprises:

a first part for engaging the third member to transmit reaction force thereby to the first member,

a second part for engaging the second member thereby to apply force thereto relative to the first member,

and resilient temporary retaining means having resilience in a direction toward the free third member for resiliently gripping the free third member and actuated in response to a fastener installation operation by the fastener installation apparatus for temporarily retaining the free third member on the installation apparatus on completion of installation of the fastener due to the resilience of said temporary retaining means, whereby the free third member is not substantially deformed.

4,958,511

METHOD AND APPARATUS FOR WEAR TESTING ANODIZED SURFACES

Leon Marcus, Tonawanda, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Dec. 21, 1989, Ser. No. 454,474

Int. Cl.[5] G01N *3/56*

U.S. Cl. 73—7 **10 Claims**

6. A wear test apparatus for testing the anodized surface coating on an electrically conductive substrate comprising:

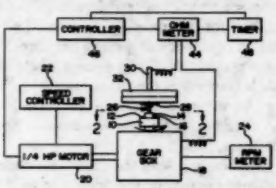
means for rotating the substrate about an axis,

a stylus for contacting the anodized surface coating at a point spaced from the axis of rotation,

means for applying force to the anodized surface coating

through the stylus so that during part rotation the stylus wears a path through the surface coating,

electrical means for testing continuity between the stylus



and the conductive substrate to determine when the stylus contacts the substrate, and

means for measuring the time required by the stylus to wear through the anodized surface coating.

4,958,512

METHOD AND A DEVICE FOR USE IN DETERMINING CONDITIONS OF RUNWAY FRICTION AND BRAKING

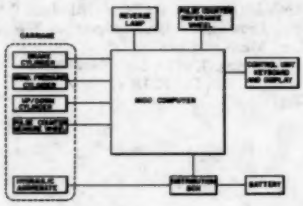
Oddvard Johnsen, Elkesvingen 8, N-3400 Lier, Norway

Filed Apr. 4, 1989, Ser. No. 333,425

Claims priority, application Norway, Apr. 7, 1988, 881513

Int. Cl.[5] G01N *19/02*

U.S. Cl. 73—9 **1 Claim**



1. A method of determining maximum runway friction from the sense of change of the coefficient of friction under actual conditions, comprising measurement and recording of forces acting on a braked wheel rolling on a runway, characterized in that a vertical force, and a horizontal force are exerted on a rolling wheel, said horizontal force being provided by wheel braking, that said forces are recorded directly, the friction coefficient between said rolling wheel and the runway and a sense of change thereof are determined solely on the basis of the recorded force values, and that the braking force is continuously changed to find a peak of a curve defined by friction coefficient versus slip values, which corresponds to the maximum coefficient of friction between the runway and said wheel under actual conditions.

4,958,513

GAS DETECTING DEVICE

Susumu Yasunaga, Osaka, and Kazuo Okino, Hyogo, both of Japan, assignors to Figaro Engineering, Inc., Osaka, Japan

Filed Feb. 2, 1989, Ser. No. 305,172

Claims priority, application Japan, Feb. 4, 1988, 63-25302

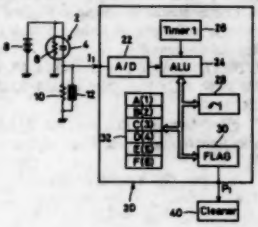
Int. Cl.[5] G01N *27/00*

U.S. Cl. 73—23.2 **4 Claims**

1. A gas detecting device adapted to detect a gas from relative variations in the output of a gas sensor, the device being characterized in that it comprises:

means for detecting a sensor output remaining substantially constant with time,

means for sampling the sensor output at about the time said means produces a signal that the sensor output is substantially constant and storing the sensor output as a reference output, and



means for detecting the gas from variations in the sensor output relative to the reference output.

4,958,514

GAS SENSING ELEMENT

Akio Takami; Toshitaka Matsuura, and Keizo Furusaki, all of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Aichi, Japan

Continuation of Ser. No. 83,018, Aug. 3, 1987, abandoned, which is a continuation of Ser. No. 786,576, Oct. 4, 1985, abandoned. This application Nov. 17, 1988, Ser. No. 273,621

Claims priority, application Japan, Oct. 13, 1984, 59-215044

Int. Cl.[5] G01N *27/04*

U.S. Cl. 73—25.03 **3 Claims**

1. A gas sensing element comprising: a ceramic substrate having the heater incorporated therein, an electrode layer formed on said ceramic substrate which provides an electrode disposed on the surface of the ceramic substrates; a first functional layer having a high gas sensitivity that overlies said ceramic substrate and said electrode layer and cover said electrode and which contains a transition metal oxide of one or more members selected from the group consisting of TiO_2, AnO, SnO_2, Nb_2O_5, and CeO_2 as a main component; and a second functional layer that has a high durability and that overlies said first functional layer and which contains 1 to 30 wt% of ZrO_2 containing no less than 5 mol% of Y_2O_3 as an anti-sintering agent and has a transition metal oxide of one or more members selected from the group consisting of TiO_2, ZnO, SnO_2, Nb_2O_5, and CeO_2 as a main component, such that said gas sensing element is capable of operation at a temperature of 350° C. and deterioration of the sensing characteristics of the functional layers due to re-sintering is prevented without causing an increase in bulk resistivity.

4,958,515

SPARK PLUG WITH A MEASUREMENT DEVICE

Gerhard Brüggen, Stuttgart; Winfried Keiper, Korntal-Münchingen, and Leo Steinke, Walblingen-Hegnach, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

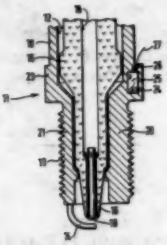
PCT No. PCT/DE87/00348, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO88/02108, PCT Pub. Date Mar. 24, 1988

PCT Filed Aug. 8, 1987, Ser. No. 314,580

Claims priority, application Fed. Rep. of Germany, Sep. 13, 1986, 3631243

Int. Cl.[5] G01M *15/00*

U.S. Cl. 73—116 7 Claims



1. A spark plug for use in an internal combustion engine having a motor block and mechanically movable parts, said spark plug comprising spark-producing means; a housing for supporting said spark-producing means and having a wall; means for mounting said housing in an engine block of an internal combustion engine so that movements of the mechanically movable parts of the internal combustion engine are transmitted to the engine block and from the latter are transmitted to said housing; and a movement sensor located in said wall of said housing for sensing movements of said housing which have been transmitted to the latter from the mechanically movable parts of the internal combustion engine through the engine block.

4,958,516

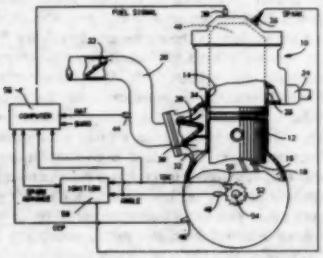
METHOD AND MEANS FOR DETERMINING AIR MASS IN A CRANKCASE SCAVENGED TWO-STROKE ENGINE

Steven D. Stiles, Clarkston; Paul E. Reinke, Rochester, and Aparicio J. Gomez, Birmingham, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Continuation of Ser. No. 377,383, Jul. 10, 1989, Pat. No. 4,920,790. This application Feb. 8, 1990, Ser. No. 478,124

Int. Cl.[5] G01M *15/00*

U.S. Cl. 73—118.2 5 Claims



1. In a crankcase scavenged two-stroke engine characterized by an operating cycle including portions during which air is inducted into a crankcase chamber of the engine, is thereafter compressed within the crankcase chamber while trapped in the crankcase chamber as the crankcase chamber undergoes shrinking volume, and is then transferred to the combustion chamber; a method for determining the mass of air transferred to the combustion chamber comprising the steps of:

determining a portion of the operating cycle at which inducted air is trapped in the crankcase;

determining the pressure P of the air mass M within the crankcase chamber during the determined portion of the operating cycle;

determining the volume V of the crankcase chamber during the determined portion of the operating cycle;

determining the temperature T of the air mass within the crankcase chamber during the determined portion of the operating cycle; and

deriving an indication of the mass of air transferred to the combustion chamber in accordance with a predetermined function of derived pressure F, volume V and temperature T.

4,958,517

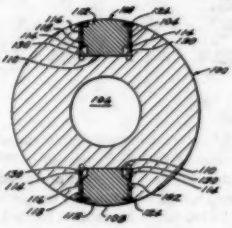
APPARATUS FOR MEASURING WEIGHT, TORQUE AND SIDE FORCE ON A DRILL BIT

Robert Maron, Cromwell, Conn., assignor to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Aug. 7, 1989, Ser. No. 390,155

Int. Cl.[5] E21B *47/00*

U.S. Cl. 73—151 24 Claims



1. Apparatus for measuring at least one load applied to a drill bit during the drilling of a well, including:

drillstring sub means adapted to be connected in a drillstring above the drill bit;

a pair of diametrically opposite openings extending only partially through the wall of said sub from an outer surface of said sub means;

plug means in each of said openings, said plug means cooperating with said openings to define an atmospheric chamber means in each of said openings;

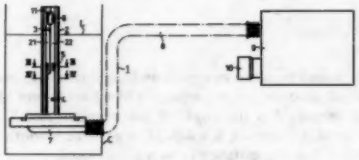
weight sensor means in each of said opening for generating an output in response to at least the parameter of weight on the drill bit; and

said weight sensor means including first weight sensor means positioned at a first predetermined position and in a first predetermined orientation in each opening to sense the effects of weight; and second weight sensor means in each opening positioned at a second predetermined position relative to the first sensor means and in a second orientation relative to the orientation of said first sensor means to cancel the effect of pressure differential across said drillstring sub.

4,958,518
SENSOR FOR DETERMINING LIQUID LEVEL IN A CONTAINER

Josef Duenstl; Siegfried Willner, both of Lichtenfels, and Ralph Schroeppel, Neenmarkt, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Oct. 18, 1988, Ser. No. 259,518
Claims priority, application Fed. Rep. of Germany, Oct. 19, 1987, 3735666; Jul. 21, 1988, 3825047
Int. Cl.[5] G01F *23/28*
U.S. Cl. 73—290 V **10 Claims**



1. Sensor means for determining liquid level in a container, comprising:

a tubular housing in said container and having a fastening flange, an interior of said tubular housing defining an interior space in communication with a surrounding space via upper and lower compensating openings;

means defining a measured distance which transversely penetrates said interior space of said tubular housing, said means including a pair of ultrasound transducers arranged in an interior wall of said housing;

drive and evaluation electronics connected to said means defining a measuring distance via electrical leads that extend in said housing wall to said ultrasound transducers; and

said tubular housing being composed of two half shells of plastic joined to one another and defining said interior space, each of said half shells surrounds one of said ultrasound transducers of said measured distance means including said electrical leads, said half shells having wall parts engaging into one another in a region below said measured distance means to form a narrow channel proceeding in an axial direction of said tubular housing, said narrow channel connecting said interior space of said housing to said lower compensating opening.

4,958,519
VELOCIMETER

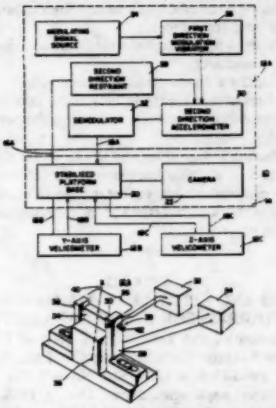
Paul W. Whaley, Lincoln, Nebr., assignor to The Board of Regents of the University of Nebraska, Lincoln, Nebr.

Continuation-in-part of Ser. No. 342,098, Jan. 25, 1982, abandoned. This application Mar. 31, 1986, Ser. No. 845,490
Int. Cl.[5] G01C *19/56*
U.S. Cl. 73—505 **16 Claims**

1. A method of obtaining a signal representing motion of an object in a curved path about an axis comprising the steps of:

periodically moving a point on a sensing means mounted to the object for movement therewith along a predetermined path different from said curved path for a number of cycles of periodic motion, wherein at lest a portion of the predetermined path is in a first direction at an angle to said curved path, whereby forces of reaction to Coriolis acceleration are exerted on said sensing means;

sensing the forces created by Coriolis acceleration of a point on said sensing means that moves along the predetermined path and converting the sensed forces of reaction to an electrical signal; wherein: (a) said sensing of the forces created by Coriolis acceleration is in a second direction at an angle to said first direction and to the curved path; and (b) said sensing and converting to an electrical signal occurs while said sensing means is prevented from being moved with respect to said object by forces by Coriolis acceleration and of angular acceleration at an angle to said predetermined path by a distance that is more than two percent of the length of the movement of the sensing means along the predetermined path during one cycle of



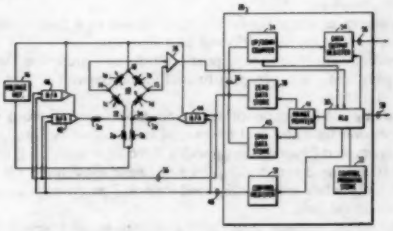
the movement of the sensing means along the predetermined path and the forces of reaction of said Coriolis and angular acceleration are passed to said object from said sensing means; and

using said electrical signal as a measure of the angular velocity of said object about said axis.

4,958,520
DIGITAL PIEZORESISTIVE PRESSURE TRANSDUCER

Craig S. Trommler, Romoland, and Mark D. Fleetrock, Riverside, both of Calif., assignors to Bourns Instruments, Inc., Riverside, Calif.

Filed Nov. 1, 1989, Ser. No. 431,366
Int. Cl.[5] G01L *7/08, 9/06*
U.S. Cl. 73—727 **8 Claims**



3. A piezoresistive transducer comprising in combination,

a bridge circuit with a pressure responsive piezoresistive element in at least one arm of said bridge, said bridge having a pair of output terminals;

a comparator having an input and an output;

means coupling said bridge output terminals to said comparator input;

said comparator output having one characteristic state when the potential of one bridge terminal is greater than the other and another characteristic state when it is less than that of the other;

means responsive to said comparator output to generate a series of digital values;

feedback means for coupling said digital values to said

bridge to drive said bridge to balance, said feedback means including a feedback digital to analog converter;

said feedback converter having a reference potential input the magnitude of which determines the magnitude of incremental change in analog output for an incremental change in digital input;

means to store a set of digital values for establishing a zero point for said transducer;

means to store a set of digital values for establishing a span for said transducer;

means including a digital to analog converter to couple zero point values to said bridge to establish a potential of one of said bridge output terminals relative to the potential of the other;

means including a digital to analog converter to couple said span values to said feedback converter reference potential input to establish an incremental change in analog output of said feedback converter for an incremental change in digital input.

4,958,521

METHOD AND APPARATUS FOR MEASURING A FORCE REQUIRED FOR STRIPPING ADHERED TAPE

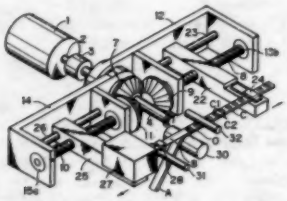
Kazuhiro Morimoto, and Tsuneo Taki, both of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Dec. 4, 1989, Ser. No. 445,751

Claims priority, application Japan, Dec. 5, 1988, 63-307641

Int. Cl.[5] G01N *3/08*

U.S. Cl. 73—827 **26 Claims**



1. A method of measuring a force required for stripping a second tape adhered to a first tape from said first tape, comprising the steps of:

stripping an initial portion of said second tape from a corresponding initial portion of said first tape;

bending said second tape portion to form a prescribed stripping angle with respect to said initial portion of said second tape;

moving said portion of said first tape released from said second tape and said portion of said second tape stripped from said first tape in opposite directions from each other at the same speed along loci of linear movement respectively while maintaining said stripping angle substantially constant; and

measuring a tensile force acting on said second tape during said movement thereby to determine the force required for stripping said second tape from said first tape.

4,958,522

SHEAR STIFFNESS TESTER

Peter R. McKinlay, South Melbourne, Australia, assignor to Amcor Limited, South Melbourne, Australia

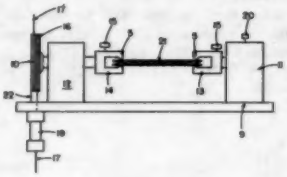
Filed Feb. 6, 1989, Ser. No. 307,411

Claims priority, application Australia, Feb. 10, 1988, P16679

Int. Cl.[5] G01N *3/22*

U.S. Cl. 73—847 **4 Claims**

1. A method of determining the shear stiffness of corrugated paperboard as an aid in processing corrugated paperboard, consisting of subjecting a sample of corrugated paperboard to a twisting force and a) measuring the initial angle of twist for a given load; or b) measuring the change in the angle of twist over time under a constant load; or c) measuring the force required to achieve an initial angle of twist; or d) measuring the change over time in the force required to maintain a given angle of twist and wherein a sample of said corrugated paper-



board is placed between two jaws and the Shear stiffness (S) is determined according to the equation $M=K\theta$ wherein M is the twisting torque, θ is the angle of jaw rotation and K is the proportionality constant $K=4a^3/3L$ wherein a=width of the sample and L is the distance between said jaws.

4,958,523

APPARATUS FOR MEASURING THE FLOW RATE OF ELECTRICALLY CONDUCTIVE LIQUIDS

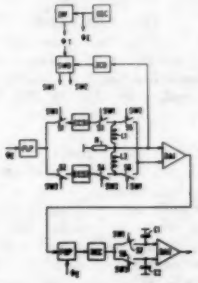
Joachim Knaak, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Interatom GmbH, Bergisch Gladbach, Fed. Rep. of Germany

Filed Jun. 9, 1989, Ser. No. 364,813

Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820936

Int. Cl.[5] G01F *1/58*; G21C *17/032*

U.S. Cl. 73—861.11 **8 Claims**



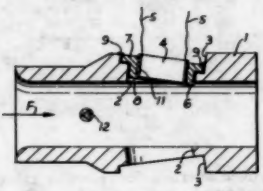
1. Apparatus for measuring the flow rate of electrically conductive liquids, comprising two coils disposed in succession as seen in the flow direction of a liquid, means for switching said coils in alternation as a primary and a secondary coil, means for exciting one of said coils with an alternating current as the primary coil, and means for measuring voltage induced by the excitation in the other of said coils as the secondary coil.

4,958,524

FLOW METER

Timothy Bonner, 8 Thamwood, Sherfield Park, Chineham, Basingstoke, Hampshire, and John R. C. Carthoys, 11 Little Basing, Old Basing, Nr. Basingstoke, Hampshire, both of England

Filed May 5, 1989, Ser. No. 348,692
Claims priority, application United Kingdom, May 10, 1988, 8810987
Int. Cl.[5] G01F 1/32, 1/66
U.S. Cl. 73—861.18 7 Claims



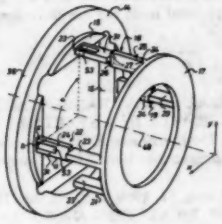
1. A flow meter as defined herein comprising a metallic conduit through which, in use, fluid flow takes place, and ultrasonic transducer means mounted in a wall of the conduit and operable to sense the presence of fluid in the conduit, the transducer means being mounted in the conduit wall in metallic mounting means which are spaced from said wall but sealed thereto by welding.

4,958,525

WEB TENSION MEASURING ASSEMBLY

Horst-Walter Hauer, and Gerda E. Hauer, both of Würzburg, Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Würzburg, Fed. Rep. of Germany

Filed Jun. 19, 1989, Ser. No. 367,747
Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822486
Int. Cl.[5] G01L 5/10
U.S. Cl. 073—862.48 9 Claims



1. A web tension measuring assembly useable to measure tension in a web on a cylinder of a rotary printing machine, said web tension measuring assembly comprising:

means for supporting at least a first end of said cylinder in a measuring cage;

a flanged ring and a retainer ring included in said measuring cage; and

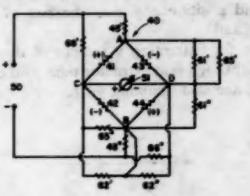
a plurality of flectional beams connecting said flanged ring and said retainer ring, each of said flectional beams including first and second parallelepipeds, each first parallelepiped being arranged crossed to each second parallelepiped in each flectional beam.

4,958,526

FORCE MEASURING DEVICE WITH ZERO ADJUSTMENT

Rolf P. Haggstrom, East Walpole, Mass., assignor to Flintab AB, Vasteras, Sweden

Filed Oct. 10, 1989, Ser. No. 419,391
Int. Cl.[5] G01L 1/22, 25/00
U.S. Cl. 73—862.67 3 Claims



3. A method for zero adjustment of a strain gage bridge in a load cell arrangement having four strain gage means and a pair of temperature compensation resistors connected between each end of a first, diagonal in said bridge and a power supply for said bridge, a second diagonal of said strain gage bridge providing an output signal, the method comprising the steps of:

(a) measuring the output signal at zero mechanical load on said load cell arrangement at two different ambient temperatures,

(b) determining a value for a first pair of substantially equal resistors to be connected as shunts across a pair of opposing arms of the strain gage bridge to make the temperature variation of the signal at zero load independent of temperature, and connecting such a first pair of resistors in the circuit;

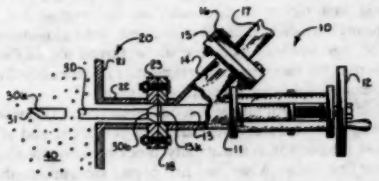
(c) determining a value for a second pair of substantially equal resistors to be connected between opposite terminals of the power supply and opposite ends of the second diagonal of the strain gage bridge to make the output signal zero when there is no mechanical load on the load cell, and connecting the second pair of resistors in the circuit.

4,958,527

SAMPLE VALVE ASSEMBLY FOR ON-LINE SAMPLING OF GRANULAR MATERIALS

Mark C. Couvillion, Mt. Clemens, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jun. 14, 1989, Ser. No. 366,815
Int. Cl.[5] G01N 1/08, 1/14
U.S. Cl. 73—863.86 10 Claims



1. A horizontal sample valve assembly for removing a sample from a bed of solid granular material contained in a vessel comprising:

a. a sampling passage in said vessel having means for mounting thereon a sampling valve;

b. the sampling valve mounted to said sampling passage, said sampling valve having a horizontally disposed body which houses therein, a horizontally disposed valve shaft which is in operable attachment to a drive means at its

outward end, with its inward end operable for sealing the valve shaft against a valve seat when the valve is in the closed position against the sampling passage;

said valve assembly also having an effluent conduit member branched from the valve body and which communicates with the interior of the valve body near the valve seat when the valve shaft is in the open position;

c. an extractor tube of a predetermined length to having an end at the valve seat of the sampling valve shaft, and a distal end positioned within the bed of solid granular material; and

d. a means for extracting a sample of the solid granular material through said extractor tube, said effluent conduit member, and said sampling valve.

4,958,528

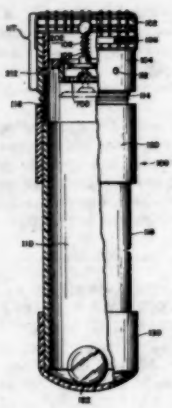
RUNOFF WATER TRAP

John M. Garrison, 3133 Waits, Ft. Worth, Tex. 76109

Continuation of Ser. No. 169,220, Mar. 16, 1988, abandoned. This application Mar. 16, 1989, Ser. No. 325,050

Int. Cl.[5] G01N *1/12*

U.S. Cl. 73—864.63 **28 Claims**



1. A liquid collection device, comprising:

first means defining a cavity for storing a quantity of liquid, said first means formed with an opening at one end through which said liquid is received, and a closed second end, said one end including screw thread means formed thereon for allowing said first means to be connected to an disconnected from a second structure;

second means, forming said second structure and removably coupled to said screw thread means at said one end of said first means, for automatically blocking said opening of said first means when said first means stores more than a predetermined quantity of said liquid, said second means consisting of at least one mechanical structure, and at least one of said mechanical structures is responsive to a level of liquid, said level causing said opening to be blocked; and

third means ,adapted to be disposed to receive a liquid stream, for automatically allowing liquid flow into said first means only after preventing an initial amount of said liquid stream from entering said first means, said third means consisting of at least one mechanical structure.

4,958,529

INTERFACE FOR COUPLING LIQUID CHROMATOGRAPHY TO SOLID OR GAS PHASE DETECTORS

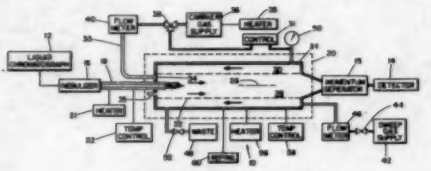
Marvin L. Vestal, Houston, Tex., assignor to Vestec Corporation, Houston, Tex.

Filed Nov. 22, 1989, Ser. No. 440,230

The portion of the term of this patent subsequent to Nov. 28, 2006, has been disclaimed.

Int. Cl.[5] G01N *1/00*

U.S. Cl. 73—864.81 **31 Claims**



1. An improved interface for receiving effluent including sample solute of interest and solvent from a liquid chromatographic device, and for outputting sample particles of interest to a detector for analysis of a sample, the interface comprising:

a gas diffusion device including a cell housing having an aerosol input port and an aerosol discharge port;

spraying means for passing the chromatographic effluent through the aerosol input port and for discharging the chromatographic effluent as an aerosol into the cell housing;

a gas diffusion membrane within the cell housing separating the cell housing into an aerosol flow chamber and an adjoining sweep gas flow chamber, the aerosol flow chamber being in fluid communication with both the aerosol input port and the aerosol discharge port for receiving and transmitting the aerosol to the detector, the sweep gas flow chamber having a sweep gas input port and a sweep gas discharge port for passing sweep gas through the sweep gas chamber in a direction counter to the flow of aerosol through the aerosol flow chamber; and

sweep gas supply means for passing a sweep gas through the sweep gas flow chamber while the aerosol is passed through the aerosol flow chamber, such that solvent vapor released from the aerosol discharged by the spraying means is diffused from the aerosol flow chamber through the membrane and to the sweep gas flow chamber, and is removed from the gas diffusion device by the sweep gas.

4,958,530

MOISTURE SEAL FOR A TRANSLATABLE PINION GEAR ASSEMBLY IN A STARTER MOTOR

James E. Jaseck, Dearborn, and Eric A. Fereshetian, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Aug. 31, 1989, Ser. No. 401,724

Int. Cl.[5] F02N *15/06*

U.S. Cl. 74—7 A **8 Claims**

1. A starter motor for an engine having a driven gear comprising:

an electric motor;

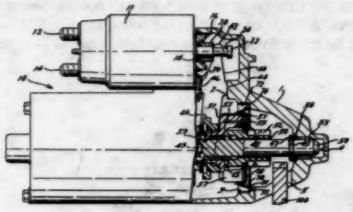
an output shaft mounted for rotation about its axis by said electric motor;

a pinion gear, having a first portion containing a plurality of gear teeth for engaging said driven gear and a shank portion adjacent thereto, mounted on said output shaft for slidable movement along said output shaft between a first position in which the gear teeth are out of engagement with said driven gear and a second position in which the gear teeth are engaged with said driven gear;

an overriding clutch mounted on said output shaft for rota-

tion therewith and engaged with said pinion gear for slidable movement therewith to provide a frictional one way rotational engagement with said pinion gear;

a housing for said motor containing an internal portion surround the overriding clutch and defining a space between said housing and said clutch to allow movement of said clutch with said pinion gear both along, and in rotation with, said output shaft;



an annular shaped member retained on said internal portion of said housing having an annular lip portion extending to said space defined between said housing and said clutch; and

cylindrical sealing member mounted on said clutch having an outwardly extending flange for contacting said annular lip portion when said pinion gear is in said first position and for breaking contact with said annular lip portion when said pinion gear is moved from its first position.

4,958,531

MECHANISM FOR TRANSMITTING ROTATIONAL MOTION FROM ONE SHAFT TO ANOTHER

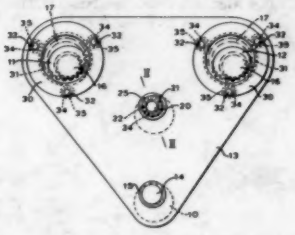
Bryan N. V. Parsons, Stoney Stanton, England, assignor to Jaguar Cars Limited, England

Filed Jul. 14, 1989, Ser. No. 379,908

Claims priority, application United Kingdom, Jul. 20, 1988, 8817218

Int. Cl.[5] F16H *37/06, 21/12, 1/32*

U.S. Cl. 74—63 12 Claims



1. A mechanism for transmitting rotational motion from one shaft to another comprising a link which is constrained to move in an orbital path, an input shaft being connected to the link so that rotation of the input shaft will cause the link to move in its orbital path and a second shaft parallel to said input shaft, said second shaft being connected to the link so that orbital motion of the link will cause the second shaft to rotate; at least one of said shafts being connected to the link by a mounting which is capable of movement in the plane of the link, said mounting making frictional engagement with the link so that when a lateral stress above a predetermined value is applied between the shaft and link, the mounting will move laterally to relieve the stress, said predetermined value being above the lateral stresses experienced during normal operation of the mechanism.

4,958,532

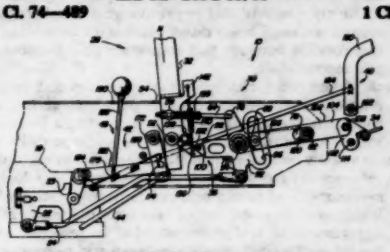
DOUBLE ACTION BRAKE HANDLE STRUCTURE

A Ping Lin, 4-5, Shih Pai Village, Chang Hwa City, Chang Hwa County, Taiwan

Filed Apr. 27, 1989, Ser. No. 343,793

Int. Cl.[5] G05G *11/00*

U.S. Cl. 74—489 1 Claim



1. A double action brake handle comprising

a mount adapted to be positioned on a chassis,

said mount including an inner hole therein and an outer hole therein,

a brake cable retainer having a first hole and a second hole therein,

a brake handle having a front recess for securing a brake cable end member, a cam surface thereon, and a hole therethrough,

a first fastener means connecting said brake cable retainer to said mount through said first hole on said brake cable retainer and said inner hole of said mount and allowing said brake cable retainer to rotate relative to said mount,

a second fastener means connecting said brake handle to said mount through said hole of said brake handle and said outer hole of said mount and allowing said brake handle to rotate relative to said mount,

a third fastener means holding a roller concentrically and axially with said second hole of said brake cable retainer and in contact with said cam surface of said brake handle, and

said cam surface being configured so that when said brake handle is depressed, said brake cable retainer will be caused to rotate in the opposite direction.

4,958,533

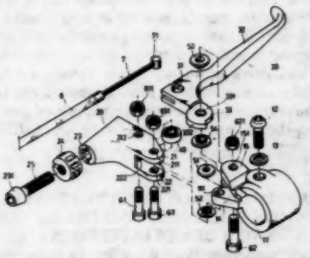
VARIABLE POSITIVE DRIVE TRANSMISSION

Roger Macpherson, 185 Pleasant Way, Penfield, N.Y. 14526

Filed May 26, 1989, Ser. No. 357,407

Int. Cl.[5] F16H *3/10*

U.S. Cl. 74—333 10 Claims



1. A variable speed transmission comprising:

a first shaft having a first series of coaxially spaced gears mounted for rotation therewith;

a second shaft having a second series of coaxially spaced gears in mesh with said first series of gears;

said first and second series of gears defining respective gear pairs of progressively varying gear ratio for selectively transmitting power from one of said shafts to the other;

a series of two-way roller clutches interposed between respective gear members of said second series of gears and said second shaft, said roller clutches being engageable for rotatively coupling said respective gear members to said second shaft and being disengageable for permitting relative rotation between said respective gear members and said second shaft;

each of said roller clutches including a cam disk having a plurality of recesses formed in its peripheral surface and a roller retainer circumferentially supporting a plurality of rollers within respective recesses in said cam disk; and

an externally controlled actuator connected to each of said retainers for indexing said roller retainers together with said plurality of rollers between respective limit positions within said recesses, one of said limit positions enabling engagement of said roller clutches in response to one direction of relative rotation between said respective gear members and said second shaft and the other of said limit positions enabling engagement of said roller clutches in response to an opposite direction of relative rotation between said respective gear members and said second shaft.

4,958,534

SHIFT DEVICE FOR HYDRAULIC TRANSMISSION

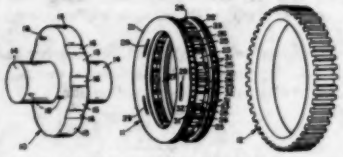
Kazuyoshi Takeda; Tadashi Takayama; Takanori Suzuki, and Haruhiko Nakanocono, all of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Jul. 19, 1989, Ser. No. 382,090

Claims priority, application Japan, Jul. 21, 1988, 63-180405

Int. Cl.[5] G05G *5/06, 7/00*

U.S. Cl. 74—475 **12 Claims**



1. A control mechanism for a hydrostatic transmission having a control shaft rotatable between a neutral position and a drive position, a shift control member movable between a neutral position and a drive position, linkage means operatively connecting said shift control member to said control shaft for rotating said control shaft between its neutral and drive positions in response to movement of said control member between its neutral and drive positions, detent means for releasably retaining said control shaft in its neutral position and means for adjusting the position for at least a portion of said detent means for adjusting the neutral position of said control shaft.

4,958,535

TRANSMISSION CONTROL STRUCTURE INCLUDING A COMBINATION DIRECTION AND CRUISE CONTROL AND A BRAKE INTERLOCK

James A. Swartzendruber, West Bend, Wis., assignor to Deere & Company, Moline, Ill.

Filed Mar. 15, 1989, Ser. No. 324,363

Int. Cl.[5] C09G *11/00*

U.S. Cl. 74—481 **23 Claims**

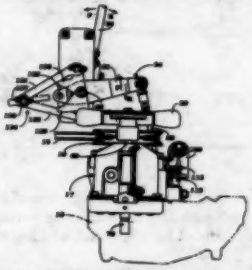
1. Direction and speed ratio control structure for a hydrostatic transmission having a control arm movable from a neutral position through first and second ranges of positions corresponding to forward and reverse speed ratio ranges, respectively, of the transmission, the control comprising:

a shuttle member operably connected to the control arm;

a movable control link connected to and positionable with respect to the shuttle member between first and second positions;

a movable speed ratio control;

means connecting the speed ratio control to the control link for operating the shuttle member to move the control arm over the first range of first positions corresponding to the forward range of speed ratios when the control link is in the first position and the speed ratio control is moved in a



preselected direction, and to move the control arm over the second range of positions corresponding to the reverse range of speed ratios when the link is in the second position and the speed ratio control is moved in said preselected direction; and

direction control means comprising a single lever movable between forward and reverse selecting positions and connected to the control link for moving the link between the first and second positions, respectively, said lever also movable to a cruise control position for selectively maintaining the transmission in a preselected forward speed ratio.

4,958,536

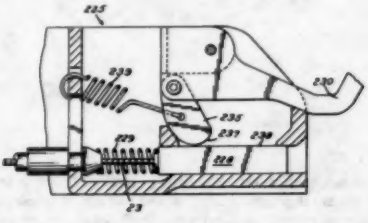
CABLE CONTROL SYSTEM

John M. Baumgarten, W. Bloomfield, Mich., assignor to Babcock Industries, Inc., Fairfield, Conn.

Filed Mar. 22, 1989, Ser. No. 326,926

Int. Cl.[5] F16C *1/10*

U.S. Cl. 74—501.5 R **40 Claims**



1. A cable control system comprising:

a spring loaded latch,

a cable having a strand attached at one end and to said latch,

means for maintaining tension on said strand in a direction away from said latch,

control means adjacent the other end of said strand and adapted in one position to engage said strand and place a tension on said strand to release said latch and in another position to release said strand such that said means for applying tension to said strand adjusts the tension on said strand,

said control means including a member on said other end of said strand, a bracket,

a lever pivoted to said bracket,

said bracket defining a track for said member on said other end of said strand,

an arm pivoted to said lever,

a stop on said bracket holding said arm out of engagement with said member, and

means yieldingly urging said arm toward said stop, said lever being operable to move said arm into engagement with said member.

4,958,537

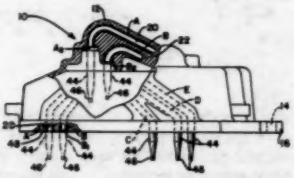
TRANSMISSION CASING COVER WITH TUBULAR CONDUIT CAST IN SITU

Rodney A. Diehl, Mt. Pleasant; Robert L. Uhrman, Jr., Brentwood, both of Tenn.; Robert G. Bishop, Troy, Mich., and Donald B. Campbell, Franklin, Tenn., assignors to Saturn Corporation, Troy, Mich.

Filed Feb. 20, 1990, Ser. No. 481,533

Int. Cl.[5] F16H 57/02; F02F 7/00

U.S. Cl. 74—606 R **5 Claims**



1. A cover in combination with a vehicle transmission casing, said cover comprising: a cast metallic body portion; said body portion having a plurality of port locations for interconnecting with a hydraulic system associated with the vehicle transmission; a plurality of conduits formed to predetermined configurations; a selected plurality of said formed conduits conjoined in a unitary manifold; said unitary manifold being encapsulated within said body portion of the cover; each said conduit within said manifold having opposed ends which communicate with selected port locations in said body portion to effect communication between said port locations.

4,958,538

METHOD AND APPARATUS FOR CONTROLLING LINE PRESSURE OF CONTINUOUSLY VARIABLE TRANSMISSION SYSTEM

Yoshinori Yamashita; Sadayuki Hirano; Katsuaki Murano, all of Shizuoka; Takumi Tatsumi, and Hiroaki Yamamoto, both of Hyogo, all of Japan, assignors to Suzuki Jidosha Kogyo Kabushiki, Shizuoka and Mitsubishi Denki Kabushiki Kaisha, Tokyo, both of, Japan

Filed Aug. 8, 1988, Ser. No. 229,900

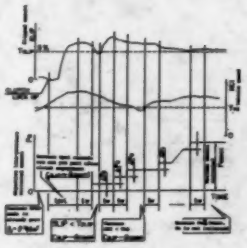
Claims priority, application Japan, Aug. 10, 1987, 62-199415

Int. Cl.[5] B60K 41/22, 41/14

U.S. Cl. 74—866 **9 Claims**

1. A method of controlling line pressure of a continuously variable transmission system, said transmission system being controlled by either expanding or contracting the width of the channel between a stationary pulley member and a movable pulley member which is movable toward and away from said stationary pulley member in order to either expand or contract the radius of rotation of a belt wound on said pulley members for eventually varying the transmission ratio, in which the method includes the steps of: controlling line pressure by raising it by a specific amount in the presence of predetermined conditions when slipping of a clutch is detected during a drive mode so that optimum clutch engagement can eventually be implemented; and detecting of said presence of said predetermined conditions, said detecting step including the steps of:

detecting of the occurrence of slipping of said clutch during said drive mode at a specific slipping rate higher than a lower limit value, and



detecting that the duration of said clutch slipping lasts for a specific period of time after passing of a certain period from the engagement of the clutch when the vehicle runs at a speed other than at a specific low speed below a predetermined velocity.

4,958,539

METHOD OF MAKING AN ELECTROSURGICAL SPATULA BLADE

Peter Staas, Moundsview; Jeffrey J. Solberg, Northfield, and Scott R. Grabinger, Maple Grove, all of Minn., assignors to Everest Medical Corporation, Brooklyn Center, Minn.

Division of Ser. No. 161,776, Feb. 29, 1988, Pat. No. 4,862,890.

This application Jun. 2, 1989, Ser. No. 360,856

Int. Cl.[5] B21K 11/00

U.S. Cl. 76—104.1 **3 Claims**

1. A method of fabricating an electrosurgical blade comprising the steps of:

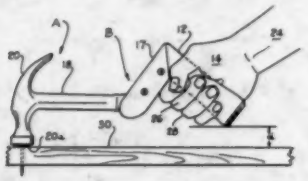
(a) forming a thin, flat substrate of a desired shape from a ceramic material;

(b) grinding a taper along a selected portion of the major surfaces of said substrate leading to the edge of said substrate;

(c) depositing a pattern of metallization on each side pattern extending over the tapered portion; and

(d) backgrinding the substrate to form a blunt edge surface face of metallization which extends between said tapered portions of said major surfaces.

4,958,540
IMPACT TOOL HANDLE
Curtis E. Davis, 1462 Tamassee Dr., Seneca, S.C. 29678
Filed Sep. 25, 1989, Ser. No. 411,997
Int. Cl.[5] B25D *1/04*; B25G *1/10*
U.S. Cl. 81—20 **8 Claims**



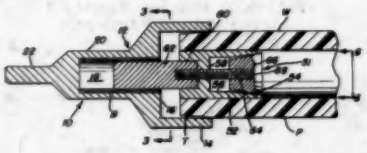
1. An impact tool having an impact handle and an impact head wherein said impact handle comprises:
a first shank which provides a grip for said handle;
a second shank extending from said first shank which is integrally connected to said first shank;
a first angle between said first and second shanks;
a third shank extending from said second shank which is integral with said second shank;
a second angle between said second and third shanks;
an elongated impact body carried by said third shank extending transverse to said third shank; and
said impact head carried at a free end of said impact body said impact head having an impact surface lying in a plane substantially parallel to a longitudinal axis of said third shank.

4,958,541
ELECTRONIC TORQUE WRENCH WITH TACTILE INDICATION
Jeffrey R. Annis, Waukesha; Timm R. Herman, Kenosha, and Ronald T. Strobel, South Milwaukee, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.
Filed Oct. 13, 1989, Ser. No. 421,407
Int. Cl.[5] B25B *23/144*
U.S. Cl. 81—479 **20 Claims**

1. In a torque wrench having sensing apparatus for producing an output signal when the torque transmitted to an associated workpiece equals or exceeds a predetermined torque level, the improvement comprising: generating means for producing a repetitive cyclical tactile indication, and control means responsive to said output signal for activating said generating means.

4,958,542
FIBERGLASS TUBE END TAPERING DEVICE
Oliver C. Skerrett, P.O. Box 249, Cedar Mt., N.C. 28718
Filed Aug. 30, 1988, Ser. No. 238,148
Int. Cl.[5] B23B *3/22*
U.S. Cl. 82—113 **5 Claims**

1. A pipe end tapering apparatus for reducing the end section of a pipe to provide close tolerance connections with pipe couplings and fittings comprising:
an expandable mandrel assembly for inserting in a pipe end and expanded to give a stable centered stationary means to support a tapering apparatus means, said mandrel assembly has a shaft means projecting from the end of a pipe to support a tapering apparatus means;
a cylindrical tapering apparatus means rotatably and reciprocatively supported on said shaft means projecting from the end of the pipe end, said cylindrical tapering apparatus having a cup shaped body with a first end and a second end;
said cup shaped body having an end wall in said first end, a protruding shaft extending from said end wall and centered on said end wall and projecting from said cup shaped body;
said shaft protruding from said end wall having a bore extending through said end wall into said shaft to support said cylindrical tapering apparatus means on said mandrel assembly projecting shaft means, and a reduced end on said shaft for connection to a means for rotating and advancing said cylindrical tapering apparatus means on said mandrel shaft to taper the end of a pipe;



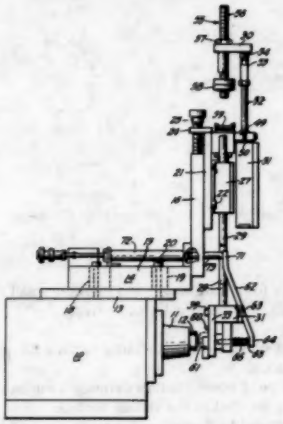
said cup shaped body having a segmented cylindrical wall means with openings separating each segment and a cutting blade mounting means on each segment;
a cutting blade means for mounting on said mounting means, said cutting blade means has a cutting edge which projects into said cup shaped body to shave a taper on the outside surface of a pipe end;
said cutting blade means having an elongated body where said cutting edge being an angled edge on said elongated body with one end of said elongated body being narrower than the other to provide said angled edge to produce a tapered end on said pipe, mounting means on said cutting blade means for connection with said mounting means on said segmented cylindrical wall means; and
said second end of said cylindrical cup shaped body being of larger diameter than the pipe end section to fit over said end section as said tapering apparatus shaves a taper on the end section by rotation in a forward movement.

4,958,543
OVERHEAD LOADER AND RELATED MECHANISMS FOR HIGH SPEED AUTOMATIC LATHES AND THE LIKE
George Newton, New Milford, and Douglas A. Parzuchowski, Danbury, both of Conn., assignors to The Dunham Tool Co., Inc., New Fairfield, Conn.
Filed Dec. 29, 1988, Ser. No. 291,493
Int. Cl.[5] B23B *13/00*
U.S. Cl. 82—124 **12 Claims**

1. An overhead loader for a high speed automatic lathe or the like having a spindle housing, a work-holding spindle rotatably mounted in said housing, and a gripping chuck carried by said spindle, said loader comprising
(a) a mounting bracket member mounted on said spindle housing and having a portion extending above said spindle,
(b) means providing for adjustable positioning of said mounting bracket member in the direction of the spindle axis,
(c) a workpiece positioning mechanism mounted on said mounting bracket member,
(d) means providing for adjustable locating of said positioning mechanism on said mounting bracket member for movement toward and away from said spindle axis,

(e) said workpiece positioning mechanism including a workpiece receiving cradle and vertically reciprocal guide means for moving said cradle from an elevated position, for receiving a workpiece from a workpiece supply during machining operations of said lathe or the like, to an extended position, in which said workpiece is aligned with said spindle axis,

(f) first actuator means connected to said guide means for



controllably raising and lowering said guide means and said cradle,

(g) stop means cooperating with said guide means for establishing the upper and lower limit positions of said cradle,

(h) at least one of said stop means being adjustable to provide for adjustment of the stroke of said first actuator means,

(i) injector actuator means operative when said cradle is in its lower limit position to inject a workpiece from said cradle and into said gripping chuck.

4,958,544

RADIAL ARM SAW

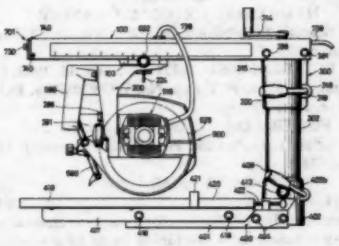
Kouichi Miyamoto, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Filed Apr. 14, 1987, Ser. No. 38,265

Claims priority, application Japan, Apr. 14, 1986, 61-56601[U]; Apr. 14, 1986, 61-56602[U]; Apr. 14, 1986, 61-56603[U]; Apr. 16, 1986, 61-57988[U]; Apr. 21, 1986, 61-60843[U]; Apr. 21, 1986, 61-60844[U]; Apr. 25, 1986, 61-63590[U]; Apr. 30, 1986, 61-66513[U]; Apr. 30, 1986, 61-66514[U]; Apr. 30, 1986, 61-66515[U]

Int. Cl.[5] B27B *5/20*; B23D *45/02*

U.S. Cl. 83—471.3 **12 Claims**



1. A radial arm saw, comprising:

a base;

a column extending vertically from said base;

a vertical position adjuster vertically adjustable on said column;

a guide arm extending horizontally from and supported by said vertical position adjuster, said guide arm having a generally inverted U-shape with a top wall and two side walls, each of said side walls having matching L-shaped grooves running longitudinally along inner sides of said two side walls of said guide arm, extensions of lower surfaces of said grooves intersecting substantially vertically below a centerline of said guide arm;

a saw member including a motor to which a saw blade is connectable;

holding means for holding said saw member to said guide arm, said holding means being slidable on said guide arm at a portion away from said vertical position adjuster, said holding means including a bearing holder and bearings symmetrically mounted on lateral sides of said bearing holder, engaging said grooves and rotatably mounted on axles aligned with said lower surfaces of said grooves, wherein said holding means further includes means for adjustably moving said bearings along directions of their respective axles, so that when said bearings are moved toward said holding means, a distance between said bearings and said grooves increases.

4,958,545

PUNCHING AND SHEARING MACHINE WITH VARIABLE CUTTING ANGLE

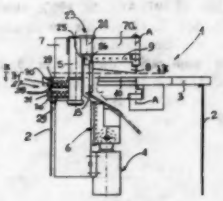
Eugenio Lenzotti, Via Petrarca 6, 41049 Sassuolo, (Province of Modena), Italy

Filed Oct. 7, 1988, Ser. No. 254,746

Claims priority, application Italy, Oct. 13, 1987, 40134 A/87

Int. Cl.[5] B26D *5/12, 7/26*

U.S. Cl. 83—559 **16 Claims**



1. Punching and shearing machine with variable cutting angle comprising a substantially horizontal worktable, guide means associated with said worktable, hydraulic means associated with a lower side of said worktable, a frame supporting said worktable, a head which moves substantially vertically with respect to said worktable, said head being actuated by said hydraulic means and guided by said guide means, said head being substantially C-shaped and having at least one first blade, at least one second blade associated with said worktable, said second blade being counterposed to said first blade for shearing therewith, adjustable elastic means, said head being automatically controlled by said adjustable elastic means for regulating a maximum value of shear force for said first blade and further determining a play between said first blade and said second blade, according to thickness and mechanical resistance of material being processed, wherein said head has an upper extension, said at least one first blade comprising at least two upper blades, said upper extension of said head supporting said at least two upper blades, said at least two upper blades having shearing ends directed towards said worktable, said upper blades being mounted on at least two respective first upper sectors which rotate about a vertical axis, said at least one second blade comprising at least two horizontal lower counter-

blades, said at least two horizontal lower counter blades being supported by said worktable by means of at least two second respective lower sectors which rotate about said vertical axis, connection means being provided for connecting said upper sectors with said lower sectors, said connection means thereby allowing for a simultaneous positioning of said upper sectors and said lower sectors, positioning means being provided to position said upper sectors and said lower sectors during a single-step rotation, lower locking means being provided for locking said lower sectors, upper locking means being provided for locking said upper sectors, once a final position has been reached, wherein said connection means comprise at least one pair of vertical prismatic columns which, at a first end, are rigidly coupled to said upper sectors and, at a second end, have hollow seats, said second end being below said worktable, said connection means further comprise at least one pair of supports rigidly associated with said lower locking means, at least one pair of cylindrical head rigidly associated with said supports, said cylindrical heads having tabs with shaped cross sections protruding at a perimeter therefrom, said hollow seats being adapted to accommodate said tabs, and in a rotation configuration, said lower locking means pushing radially on said supports to create a perfect insertion coupling between said tabs and said hollow seats, thereby causing said upper sectors to be rigidly associated with said lower sectors.

4,958,546

SAW BLADE

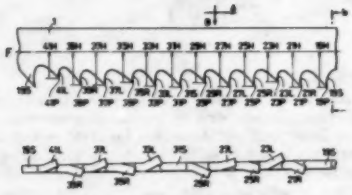
Sumio Yoshida, Ono; Yoshikazu Takegawa, Miki; Susumu Tsujimoto, Ono, and Katsuhiko Kawabata, Takasago, all of Japan, assignors to Amada Company, Limited, Japan

Division of Ser. No. 87,392, Aug. 18, 1987, which is a division of Ser. No. 847,731, Apr. 3, 1986. This application Mar. 2, 1989, Ser. No. 317,860

Claims priority, application Japan, Apr. 3, 1985, 60-069239; Dec. 12, 1985, 60-277842; Dec. 26, 1985, 60-291894

Int. Cl.[5] B27B *33/02*

U.S. Cl. 83—848 **14 Claims**



1. A saw blade for cutting metallic materials comprising a combination of a right-set tooth, which is bent to the right, a left-set tooth which is bent to the left in relation to the running direction of the saw blade, and an unset tooth which is not bent, and

further comprising:

a first pattern wherein the teeth are positioned in the running direction in the order of right set tooth, unset tooth, left-set tooth; and

a second pattern wherein the teeth are positioned in the running direction in the order of left-set tooth, unset tooth, right-set tooth; and

an odd number greater than one of additional set teeth positioned between said first and second patterns,

wherein said additional set teeth are positioned such that right-set teeth and left-set teeth are adjacent each other.

4,958,547

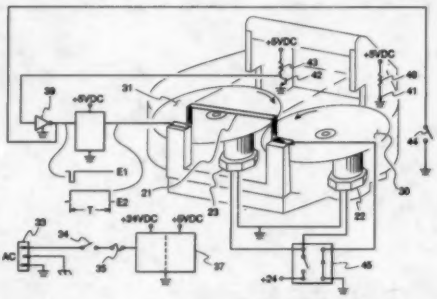
WORK ACTIVATED SMALL BREAD SLICING MACHINE

George J. Low, 300 Plum Space 91, Capitola, Calif. 95010

Filed Jan. 19, 1989, Ser. No. 298,960

Int. Cl.[5] B26D *3/30*

U.S. Cl. 83—873 **5 Claims**



1. A device for slicing single and multiple small bread items such as bagels, buns, and rolls, comprising:

a housing;

an inclined chute having a sliding surface for guiding said bread items;

first and second rotary knives defining a cutting plane substantially parallel to the sliding surface;

first and second knife motors for actuating said knives;

first and second walls located at an upper end of said chute, each of said walls mounted on opposed sides of said chute;

first and second knife shields located at the lower end of said chute adjacent said knives, each of said shields mounted on one of said opposed sides of said chute;

first and second cowling posts mounted adjacent each of said shields;

a knife cowling mounted on both said cowling posts, wherein the knives are located between the knife cowling and sliding surface;

an electrical control circuit for the activation of said motors, the control circuit comprising a work sensing transmitter mounted on one of said walls and a work sensing receiver mounted on the other of said walls, said transmitter and receiver configured to sense the presence of said small bread item on the chute and to activate the motors when said bread item is sensed;

the control circuit further comprising a metal strip mounted on said cowling and forming a cowling interlock with said posts, said cowling interlock providing an electrical continuity between said posts so as to permit activation of said motors and for preventing the activation of said motors when said cowling is removed from said device.

4,958,548

HYDRAULIC DRIVE MECHANISM

Eckehart Schulze, Stahlbühlstr. 36, 7251 Weissach 2, Fed. Rep. of Germany

PCT No. PCT/DE88/00635, § 371 Date Jun. 16, 1989, § 102(e) Date Jun. 16, 1989, PCT Pub. No. WO89/03484, PCT Pub. Date Apr. 20, 1989

PCT Filed Oct. 15, 1988, Ser. No. 368,318

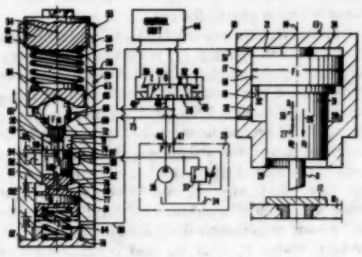
Claims priority, application Fed. Rep. of Germany, Oct. 16, 1987, 3735123

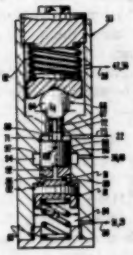
Int. Cl.[5] F15B *11/08*

U.S. Cl. 91—420 **8 Claims**

1. Hydraulic drive mechanism for a machine element executing, during a course of a machining cycle of a workpiece, a rapid feed movement leading to the workplace, thereupon, with a same travel direction, a working stroke and subsequently a rapid retraction stroke leading back into an initial

position, the hydraulic drive mechanism including a double-acting hydrocylinder means constructed as a differential cylinder means reciprocably accommodating a differential piston having large and small pistons areas defining large and small drive pressure chambers, said hydrocylinder means being adapted to provide a rapid feed operation of the machine element by jointly applying an output pressure of a pressure supply unit, and alternative pressurization and a pressure relief thereby making it possible to control an under-load and working feed of the machine element at increased feeding power, as well as rapid retraction operation; a pressure-controlled area switching valve means for switching from rapid to under-load feed operation, said switching valve means, once a drive pressure in the drive pressure chambers of the hydrocylinder means exceeds a threshold value corresponding to a high percentage of a maximum output pressure of the pressure supply unit, effecting switchover of the hydrocylinder means from a differential operation to a unilateral pressure application to the large piston area of the differential piston of the hydro-





cylinder means and pressure relief of the small piston area of the differential piston of the hydrocylinder means, said switching valve means comprising a check valve means adapted to be acted upon in an opening direction by operating pressure ambient in the small drive pressure chamber of the hydrocylinder means, a valve body, a pretensioned closing spring means for urging the valve body into a closed position by a closing force equivalent to a fraction of an opening pressure of the output pressure of the pressure supply unit, said switching valve means further comprising a pressure-controlled slide valve with a valve body constructed as a stepped piston having a large and small piston step, a slightly pretensioned returned spring means for urging the valve body of the switching valve means into contact with the valve body of the check valve means and, in the closed position of the check valve means, is retained in a functional position wherein the small drive pressure chamber of the hydrocylinder means is exposed to the output pressure of the pressure supply unit and, in the open position of the check valve means, enters into a position wherein the small drive pressure chamber is pressure relieved, the large piston step of the stepped piston is acted upon by the pressure ambient in the large drive pressure chamber of the hydrocylinder means; and wherein a ratio of an effective area of the large piston step of the stepped piston to a cross-sectional area bounded by a valve seat of the check valve means, within which the valve body of the check valve means is acted upon in the opening direction by the pressure ambient in the small drive pressure chamber is larger by a defined fraction then a ratio of the large piston area defining the large drive pressure chamber of the hydrocylinder means to the small piston area, defining the small drive pressure chamber.

4,958,549

PEDAL MECHANISM FOR A BASS DRUM

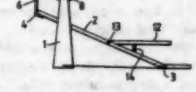
Vuk Vukovic, 142 Inchmery Rd., Catford, London SE6, England

Continuation of Ser. No. 189,465, May 2, 1988, abandoned. This application Jul. 18, 1989, Ser. No. 380,775

Claims priority, application United Kingdom, May 15, 1987, 8711483

Int. Cl.[5] G10D *13/04*

U.S. Cl. 84—422.1 **15 Claims**



1. A pedal mechanism for a base drum, said mechanism comprising:

a primary platform, support means coupled to said primary platform for supporting said primary platform for pivotal movement about a first axis of rotation;

a beater ball, said beater ball being moveable between an at-rest position and an operative position, said operative position being defined as that position when said beater ball is in contact with the base drum with which said mechanism cooperates;

coupling means for connecting said beater ball to said primary platform, said primary platform being moveable about said first axis to move said beater ball between said at-rest position and said operative position, and

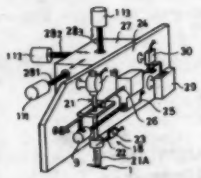
a second platform supported for pivotal movement relative to said primary platform, said secondary platform being moveable about a second axis of rotation, said second axis being generally parallel to said first axis, said secondary platform co-operating with said primary platform and forming an angle with said primary platform where said secondary platform cooperates with said primary platform, said secondary platform pivoting relative to said primary platform and about said second axis so that said co-operation between said secondary platform and said primary platform causes said primary platform to pivot about said first axis and move said beater ball from said at-rest position to said operative position whereby said beater ball moves into contact with said drum when said primary platform is urged by the sole area of the user's foot thereby causing said primary platform to pivot about said first axis or when said secondary platform is urged by the heel area of the user's foot thereby causing said secondary platform to pivot about said second axis.

4,958,550

TUNING METHOD AND APPARATUS FOR KEYBOARD MUSICAL INSTRUMENT

Hidenori Kugimoto, Hamamatsu, Japan, assignor to Kabushiki Kaisha Kawai Gakki Seisakusho, Hamamatsu, Japan

Filed Sep. 13, 1988, Ser. No. 244,049
Claims priority, application Japan, Sep. 14, 1987, 67-228484
Int. Cl.[5] G10G *7/02*
U.S. Cl. 84—454 **4 Claims**



1. A tuning apparatus for a keyboard musical instrument comprising:

load-applying means arranged such that a load-use weight which is movable by a first servomotor is attached to one end of a balance, said balance being pivotally supported at the other end thereof on a first support member which is movable by a second servomotor, and that a load is applied to a string set up in place from the front end of a load-applying member which engages said balance;

measuring means for measuring the displacement of the string at said load-applying member when said load-applying means is in operation; said measuring means being attached to said first support member;

calculation means for calculating a deviation between a displacement value of the string measured by said measuring means and a displacement value of the string preselected to produce a predetermined frequency of vibration; and

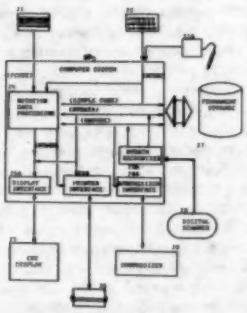
a rotating member for rotating a tuning pin by a third servomotor until the deviation calculated by said calculation means is reduced to zero, said rotating member being attached to a second support member which is movable by a fourth servomotor.

4,958,551

COMPUTERIZED MUSIC NOTATION SYSTEM

Philip Y. F. Lui, 35 W. 64th St., New York, N.Y. 10023

Continuation of Ser. No. 44,839, Apr. 30, 1987, abandoned. This application Mar. 30, 1989, Ser. No. 332,412
Int. Cl.[5] G09B *15/04*; G10G *3/04*; G10H *7/00*
U.S. Cl. 84—462 **32 Claims**



1. A computerized music notation system comprising:

(a) first input means for entering a series of pitch codes representing respective pitches which are to be designated as occurring in a series of basic music intervals of a music piece;

(b) second input means for entering, separately and independently of said first input, a series of relative rhythm codes for designating respective types of rhythm elements, including said pitches, as occurring in the basic music intervals of the music piece, wherein said relative rhythm codes include at least a series of main division codes, each of which represents a respective main division rhythm element designated as occurring in a basic music interval, and interposed demarcation codes each of which delimits a respective one of the basic music intervals of the music piece, wherein the rhythm codes for each basic music interval includes one or more main division codes and a demarcation code delimiting each said basic music interval;

(c) third input means for selecting a desired interval duration value to be assigned to each of the basic music intervals corresponding to a selected time signature for a desired music notation output for the music piece;

(d) computer means connected to said first, second, and third input means and having: (1) programmed counting means for counting the number of main division codes occurring in each basic music interval, as delimited by a respective demarcation code, from said rhythm codes entered through said second input; and (2) programmed duration assigning means for assigning a fixed duration value to each of the main division rhythm elements in each respective basic music interval, said fixed duration value being based upon said selected interval duration value assigned to the basic music intervals divided by the number of main division codes counted by said programmed counting means as occurring in each said basic music interval; and

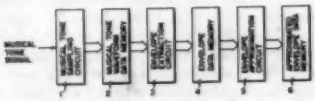
(e) output means for providing a music notation output in the selected time signature based upon the rhythm codes designating the rhythm elements including pitches in the basic music intervals of the music piece, the pitch codes representing pitches for the respective rhythm elements, and the fixed duration values assigned to the respective rhythm elements by said computer means.

4,958,552

APPARATUS FOR EXTRACTING ENVELOPE DATA FROM AN INPUT WAVEFORM SIGNAL AND FOR APPROXIMATING THE EXTRACTED ENVELOPE DATA

Junichi Minamitaka, Fussa; Kunio Sato, Sagamihara, and Mayumi Ino, Akishima, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 117,082, Nov. 3, 1987, abandoned. This application Sep. 14, 1989, Ser. No. 408,412
Claims priority, application Japan, Nov. 6, 1986, 61-264205; Nov. 6, 1986, 61-264206; Nov. 6, 1986, 61-264207; Nov. 6, 1986, 61-170531[U]; Nov. 6, 1986, 61-170532[U]; Nov. 6, 1986, 61-170533[U]; Nov. 6, 1986, 61-170534[U]; Nov. 6, 1986, 61-170535[U]; Nov. 6, 1986, 61-170536[U]; Nov. 6, 1986, 61-170537[U]; Nov. 6, 1986, 61-170538[U]; Nov. 6, 1986, 61-170539[U]
Int. Cl.[5] G10H *1/057, 7/08*
U.S. Cl. 84—603 **24 Claims**



18. An envelope approximating apparatus which approximates an envelope waveform described by envelope data, in the form of a limited number of function waveforms whose

characteristic changes at switching points, said apparatus comprising:

function data generating means for generating function data corresponding to said limited number of function waveforms;

computing means coupled to said function data generating means for computing an evaluation value corresponding to an error between said function data and the envelope data representative of said envelope waveforms and

switching point deciding means coupled to said computing means for deciding a switching point to be provided between successive ones of the limited number of function waveforms, for optimizing said evaluation value in accordance with the limited number of function waveforms.

4,958,553

HYDRAULIC CONTROLLER

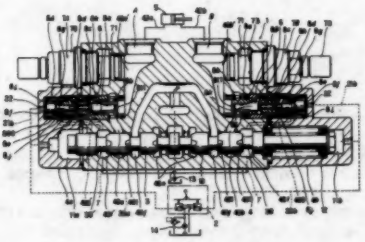
Katsumi Ueno, Saitama, Japan, assignor to Diesel KIKI Co., Ltd., Tokyo, Japan

Filed Apr. 20, 1989, Ser. No. 341,357

Claims priority, application Japan, Apr. 22, 1988, 63-53538; Apr. 22, 1988, 63-53539

Int. Cl.[5] F15B *13/042*

U.S. Cl. 91—447 **11 Claims**



1. In a hydraulic controller equipped with a directional control valve disposed on a system connecting an actuator from an oil hydraulic pump, the directional control valve having a main spool running through a valve body, the main spool being operated on an external pilot oil pressure, the improvement characterized in that:

two sets of cylinder passages **40***a*, **40***a'* and **40***b*, **40***b'* of a separate structure are formed on the valve body **4**, horizontal tunnels **6**, **6** are formed so as to intersect each set of the cylinder passages **40***a*, **40***a'* and **40***b*, **40***b'*, nonleak valves **8A**, **8B** are mounted on the horizontal tunnels **6**, **6** each;

said nonleak valves **8A**, **8B** are equipped each with a main passage poppet **8***b* having a switching nose and a throttle **811** on the nose, a spring **8***c* for energizing it normally to a close side, a pilot poppet **8***e* for controlling pressure of a spring chamber **8***k* with the spring disposed therein, a piston **8***f* for operating the pilot poppet **8***e*;

the nonleak valves **8A**, **8B** have a passage structure whereby a load pressure oil from a cylinder port is shut up around the pilot poppet **8***e* by way of the throttle **811**, the spring chamber **8***k* and the horizontal tunnel **6**, when a main spool **3** is neutral;

pilot passages **20***a*, **20***b* leading to an end portion of a main spool **1** from an oil pressure pilot valve communicate partly with the piston **8***f* of the nonleak valves **8A**, **8B**, and when a pilot oil pressure is applied to the main spool **1**, the pilot oil pressure works on the piston **8***f* concurrently.

4,958,554

FIRE PROTECTION FILTER

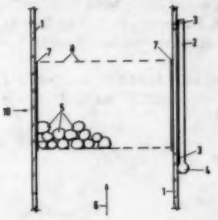
Michael M. Spaeth, Lindwurmstrasse 10/VII, D-8000 Munich, Fed. Rep. of Germany

Filed Jun. 12, 1989, Ser. No. 364,125

Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819832

Int. Cl.[5] F24F *11/00*

U.S. Cl. 98—1 **23 Claims**



1. A fire protection filter for a ventilation duct comprising a lattice of at least one layer made of an air permeable, highly thermally conductive, expanded aluminum foil less than 0.01 mm thick, said lattice being adapted to be mounted transverse to the direction of flow in the ventilation duct and having a length along the direction of flow sufficient to prevent flames from going through said lattice without significantly impeding the flow.

4,958,555

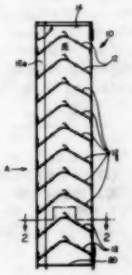
SIGHT PROOF, DRAINABLE BLADE LOUVER ASSEMBLY

Gary J. Lentz, Bradner, and Michael J. Almagner, Toledo, both of Ohio, assignors to Mestek, Inc., Westfield, Mass.

Filed Oct. 23, 1989, Ser. No. 425,699

Int. Cl.[5] F24F *13/08*

U.S. Cl. 98—121.1 **10 Claims**



1. A sight proof, drainable louver assembly for the flow of air therethrough from an inlet to an outlet, said louver assembly comprising:

a plurality of spaced apart louver blades, said blades being arranged in a generally vertically extending stack; and

frame means surrounding and engaging said louver blades;

each of said louver blades having a configuration, in vertical cross-section, similar to an inverted V, with an inclined, first portion which extends upwardly in the direction of the flow of air through said louver assembly, and an inclined second portion which extends downwardly from said first portion in the direction of the flow of air through said louver assembly, said first portion having a flange

portion which extends generally vertically upwardly from a leading edge thereof partly to the blade thereabove and a lip which extends inwardly and downwardly from a free, upper edge of said flange portion of said first portion partly to said first portion of said blade;

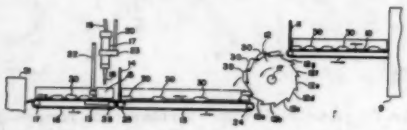
adjacent blades in said stack being spaced sufficiently closely to block a direct line of sight through said louver assembly.

4,958,556

FILLED CRACKER MAKING APPARATUS

Agostino Aquino, Patterson, N.J., and Karl U. Lang, Port Jervis, N.Y., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed May 16, 1989, Ser. No. 352,205
Int. Cl.[5] A21C *9/06*
U.S. Cl. 99—355 **10 Claims**



1. An apparatus for producing filled hard biscuit products comprising:

(a) means to mix a dough;

(b) means to form said mixed dough into a plurality of dough forms;

(c) oven means to bake said dough forms to produce essentially hollow baked forms wherein the baked forms have a top surface and a bottom surface;

(d) first conveyor means to convey said baked forms from the oven means;

(e) a baked form inverter means to receive the baked forms from said first conveyor means and to invert the baked forms;

(f) second conveyor means to convey the inverted baked forms from the inverter means;

(g) a holding means to receive the inverted baked forms from the second conveyor means; and

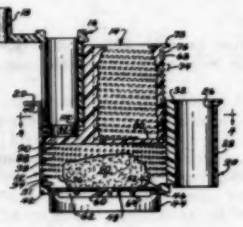
(h) a plurality of filling needles that move vertically downwardly and upwardly and fill each inverted baked form in said holding means wherein said holding means holds said inverted baked forms in a stationary position during filling and releases the filled baked forms when the filling needles move upwardly.

4,958,557

RENDERED FAT SEPARATOR

Jeffrey Fiala, P.O. Box 302, Brookfield, Ill.

Filed Oct. 17, 1989, Ser. No. 422,687
Int. Cl.[5] A47J *19/00*; B30B *9/02*
U.S. Cl. 99—495 **11 Claims**



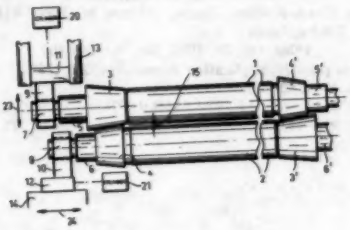
1. An apparatus for separating rendered fat from cooked food, comprising a perforate bowl means for receiving the food, rotary press means for applying a force to said food to squeeze out said rendered fat, engageable means intercoupling said rotary press means with said bowl means to provide a travel path for said rotary press means toward said food, and driving sprocket means cooperatively engaged with said bowl-like means, the engageable means and said rotary press means for forcing said rotary press means against said food to extract a substantial amount of said rendered fat.

4,958,558

ADJUSTING SYSTEM FOR THE GAP WIDTH OF SUPPORT ROLL PAIRS IN A DOUBLE-BELT PRESS

Rupert Harreither, Baden, Austria, assignor to Austria Metall Aktiengesellschaft, Braunau, Austria

Filed Sep. 27, 1989, Ser. No. 413,529
Claims priority, application Austria, Sep. 27, 1988, 2375/88
Int. Cl.[5] B30B *13/00, 5/06*
U.S. Cl. 100—41 **7 Claims**



1. An adjusting apparatus for a double-belt press, comprising:

a pair of support rolls;

respective bearings journaling said rolls for rotation about generally parallel axes;

respective generally conical formations at each end of each of said rolls bearing radially upon the conical formations of the other roll, the conical formations of each roll tapering in the same direction; and

means for relatively shifting the bearings of said rolls whereby axial regions at which the conical formations of the two rolls bear upon one another are shifted to vary the width of a gap formed between said rolls.

4,958,559

CYLINDER PRESS DRIVE ASSEMBLY

Henry J. Bubley, Deerfield, Ill.; Joseph Glotzbach, Chanute, Kans., and Phil Motev, Deerfield, Ill., assignors to American Screen Printing Company, Chicago, Ill.

Filed Oct. 4, 1988, Ser. No. 253,122
Int. Cl.[5] B41L *13/16*
U.S. Cl. 101—123 **6 Claims**

1. In a screen printing cylinder press for screen printing on a sheet, the combination comprising:

a cylinder mounted for rotating in the press and having a gripper thereon to grip a sheet,

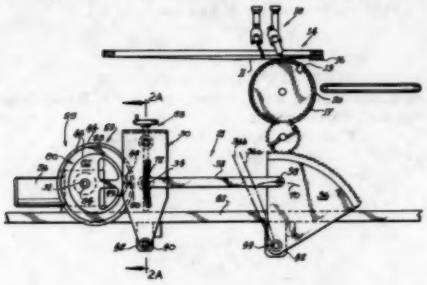
a screen printing means including a movable screen printing carriage for screen printing on the sheet,

connecting means connected to the cylinder to oscillate the same through a stroke of a given length, and

a cam means having a predetermined profile cam surface and a cam follower for following the cam surface and connected to the connecting means to actuate the latter to turn the cylinder and to reciprocate this screen printing means,

said cam profile surface providing a displacement and velocity curve characteristic to turn the cylinder to its maxi-

mum rotational velocity in less than fifty percent of the turning time in each direction and for decelerating the



cylinder over a time period greater than fifty percent of rotating travel time in each direction.

4,958,560

PRINTING SCREEN AND METHOD OF PRINTING A NON-ABSORBENT SUBSTRATE

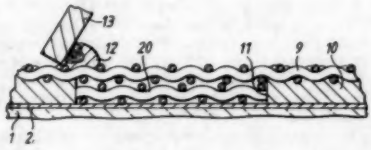
Terence W. Collins, St. Helens, England, assignor to Pilkington plc, Merseyside, England

Filed Mar. 1, 1988, Ser. No. 162,683

Claims priority, application United Kingdom, Mar. 4, 1987, 8705075

Int. Cl.[5] **B41F** *15/36;* **B05D** *1/32*

U.S. Cl. 101—128.21 **18 Claims**



1. An improved method of screen printing a patterned ink layer on a hard non-absorbent substrate using a screen with a patterned coating on its surface facing the substrate, said method comprising the steps of providing between the screen surface and the substrate local support distributed over at least one area in which a patterned ink layer of increased thickness is required thereby enhancing ink retention in said at least one area, the at least one area comprising only a part of the patterned ink layer printed by said screen, applying ink to said screen and printing the patterned ink layer on said substrate through said screen, whereby the ink layer in said at least one area is thicker than in another area of the ink layer.

4,958,561

INKING BAR FOR FLUSH INKING UNIT

Heinrich K. Grosshauser; Willi A. P. Kutzner, and Georg Schneider, all of Wurzburg, Fed. Rep. of Germany, assignors to Koenig & Bauer Aktiengesellschaft, Wiirzburg, Fed. Rep. of Germany

Filed Nov. 1, 1988, Ser. No. 265,568

Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3737531

Int. Cl.[5] **B41F** *31/04, 31/06;* **B41L** *27/08*

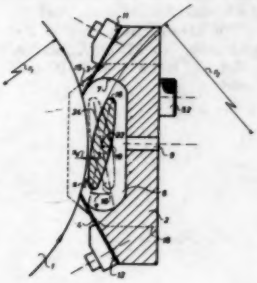
U.S. Cl. 101—363 **7 Claims**

1. An inking bar assembly for a flush inking unit of a rotary printing press, said inking bar assembly being positionable adjacent to, and cooperable with a rotatable ink fountain roller, said assembly comprising;

a rotatable screened ink fountain roller;

an inking bar positionable adjacent a peripheral surface of said ink fountain roller and extending along said peripheral surface of said ink fountain roller generally parallel to an axis of rotation of said ink fountain roller;

an ink distributing chamber in said inking bar, said ink distributing chamber having a length generally the same as said inking bar and being formed between spaced doctor blades which are secured to said inking bar and which contact said peripheral surface of said ink fountain roller;



a profiled body having a generally non-circular cross-sectional shape and being positioned within said ink distributing chamber to facilitate unrestricted flow of ink around said profile body to said ink fountain roller, said profiled body having an elongated axis which is generally parallel to said axis of rotation of said ink fountain roller;

axially extending support journals at first and second ends of said profiled body; and

means engaging each of said axially extending support journals to support said profiled body in said ink distributing chamber for pivotal movement about said elongated axis of said profiled body to vary an amount of angulation between a peripheral surface of said profiled body and said periphery of said ink fountain roller.

4,958,562

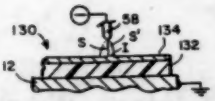
PRINTING MEMBER WITH AN ORGANIC PLASTIC SURFACE AND METHOD FOR IMAGING

Thomas E. Lewis, E. Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Presstek, Inc., Hudson, N.H.

Division of Ser. No. 234,475, Aug. 19, 1988, Pat. No. 4,911,075. This application Sep. 21, 1989, Ser. No. 411,095

Int. Cl.[5] **B41N** *1/08;* **B41C** *1/10*

U.S. Cl. 101—457 **11 Claims**



1. The method of making a printing member for a press without dampening comprising the steps of:

coating a conductive metal body with an organic plastic layer having an exposed surface which is highly oleophobic;

spacing a movable point electrode opposite selected image points on said surface, and

establishing a potential difference between said electrode and said conductive metal body to produce spark discharges between said electrode and said printing member at said image points without contacting said surface and without penetrating through said body so that there is thermal transformation of said surface structure which renders said surface oleophilic at said image points.

4,958,563

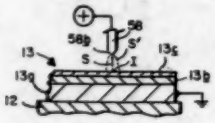
LITHOGRAPHY PLATE WITH A CHROMIUM SURFACE AND METHOD FOR IMAGING

Thomas E. Lewis, E. Hampstead; Bradley W. Davidson, Merrimack; Richard A. Williams, Hampstead, all of N.H.; Michael T. Nowak, Gardner, Mass., and John F. Kline, Hudson, N.H., assignors to Presstek, Inc., Hudson, N.H.

Division of Ser. No. 234,475, Aug. 19, 1988, Pat. No. 4,911,075. This application Sep. 21, 1989, Ser. No. 410,327

Int. Cl.[5] B41N *1/08*; B41C *1/10*

U.S. Cl. 101—458 **16 Claims**



1. A method of making a printing member for a press with dampening comprising the steps of:

forming a metal body with an exposed surface of chromium metal having a grained surface structure with capillaries making said surface hydrophilic, and

heating without contact said surface at selected image points thereon to transform the surface structure to render said surface nonwater-retaining at said image points.

4,958,564

METHOD AND SYSTEM FOR PREPARING A PLANOGRAPHIC PRINTING FORM

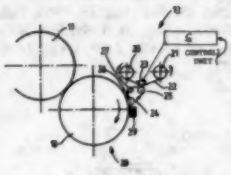
Hartmut Fuhrmann, Karlsfeld, and Reinhard Plaschka, Neuried, both of Fed. Rep. of Germany, assignors to Man Roland Druckmaschine AG, Offenbach am Main, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,299

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834270

Int. Cl.[5] B41C *1/05, 1/10*

U.S. Cl. 101—467 **14 Claims**



1. Method of making a planographic printing form (10) comprising the steps of

providing a thermo transfer element (22) having ink-accepting surface areas;

providing an auxiliary transfer element (24, 24', 35);

contacting said thermo transfer element and said auxiliary transfer element;

selectively thermally transferring thermally affectable material from said thermo transfer element to the auxiliary transfer element under control of a control unit (C) in accordance with an image to be printed; and

transferring said thermally affectable material from one of said elements to said printing form.

4,958,565

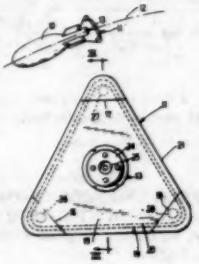
INFLATABLE DECELERATOR

Mark A. Koch, Sioux Falls, S. Dak., assignor to Raven Industries, Inc., Sioux Falls, S. Dak.

Filed May 25, 1988, Ser. No. 198,512

Int. Cl.[5] B64D *17/80, 19/00*

U.S. Cl. 102—386 **11 Claims**



11. A decelerator structure for attachment to a munition to be deployed from an aircraft comprising in combination:

a first equilateral triangularly shaped section of fabric with rounded apexes and straight sides between said apexes;

a second equilateral trisngularly shaped section of fabric with rounded apexes and straight sides between said apexes being of equal size and shape to the first section;

means defining openings at the apex of the second section;

scoops at the apexes facing inwardly directing a flow of air through said opening means;

attachment means centrally located in the second section of fabric; and

stitching extending around the entire periphery of the fabric sections and joining the fabric sections and spaced inwardly from the outer edge of the sections of fabric so that the projecting outer edge constitutes a turbulence generator enhancing stability of the decelerator structure.

4,958,566

BRAKING MECHANISM FOR ROTATING FLYING OBJECTS

Gerhard Siebrand, Quickborn, and Bruno Stürzenbecher, Norderstedt, both of Fed. Rep. of Germany, assignors to Autoflug GmbH, Rellingen, Fed. Rep. of Germany

Filed Dec. 9, 1988, Ser. No. 282,029

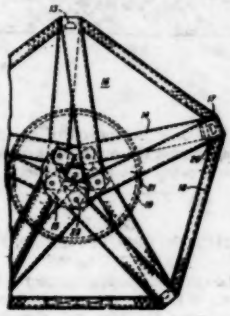
Claims priority, application Fed. Rep. of Germany, Dec. 10, 1987, 3741779

Int. Cl.[5] F42B *10/56*

U.S. Cl. 102—400 **11 Claims**

1. A braking mechanism for centrally taking up load arising especially from a rotating flying object with such load being taken up by an apex of the braking mechanism involving problems distinguishable from problems encountered with a parachute that has load taken up along an outer edge of the parachute via lines therewith so that an apex of the parachute is in no way connected with load of any flying object, said braking mechanism including a planar fabric sheet having an outer rim and a central attachment base portion that can be secured to said flying object, with said fabric sheet being adapted to be stored in a folded-up readiness state in said flying object and, when released and unfolded, being adapted to form a braking surface that encircles said flying object; said braking mechanism further comprises:

a plurality of radial reinforcing strips that each extend radially between said central attachment base portion and said outer rim and are distributed about the periphery of said braking mechanism, whereby each of said reinforcing strips extends from said central attachment base portion to said outer rim and back to said central attachment base portion to at least partially form two layers and to form



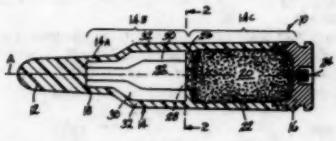
loop-like pockets at said outer rim of said fabric sheet of said braking mechanism, with centrifugal weights being disposed in said pockets, said central attachment base portion taking up load of the rotating flying object transmitted thereto via the braking surface that encircles said flying object and such load is thus transmitted to the apex of the braking mechanism.

4,958,567

TRAINING CARTRIDGE WITH IMPROVED CASE FOR FIXING PROPELLANT POSITION IN POWDER CHAMBER

Richard H. Olson, Florissant, Mo., assignor to Olin Corporation, Stamford, Conn.

Filed Apr. 10, 1989, Ser. No. 335,330
Int. Cl.[5] F42B *8/02*
U.S. Cl. 102—444 **19 Claims**



1. A training cartridge, comprising:
(a) a front bullet;
(b) a rear base for mounting a primer being operable for effecting ignition of a propellant charge;
(c) a middle case having tandemly-arranged and integrally connected leading and trailing portions;
(d) said trailing portion of said case being in the form of a cylindrical wall connected at its rearward end to said base and therewith defining a powder chamber closed at its rearward end and extending forwardly of said base for housing the propellant charge;
(e) said leading portion of said case integrally connected to said bullet so as to have a one-piece construction therewith; and
(f) a rupturable closure wall integrally connected to said case at the location of merger of said trailing and leading portions thereof, said wall extending transversely across said case for closing a forward end of said powder chamber, said location of said closure wall being preselected to tailor the internal volume of said powder chamber to generally equal that of the quantity of said propellant charge so as to retain said propellant charge in a fixed position in said powder chamber adjacent said base regardless of the elevation of said training cartridge.

4,958,568

MAXIMUM VOLUME REIFENHAUSER SHOTSHELL

Morris C. Buenemann, Florissant, Mo., assignor to Olin Corporation, Cheshire, Conn.

Filed Aug. 28, 1989, Ser. No. 399,210
Int. Cl.[5] F42B *5/30*
U.S. Cl. 102—466 **11 Claims**

7. A shotshell comprising: a biaxially oriented tubular casing wall made of a high density polyethylene having a pair of open ends; and
an injection molded basewad made of said high density polyethylene molded in place at one of said open ends so as to close and seal said end, said basewad having an axially extending annular skirt portion having a radial thickness generally less than said casing wall fused to the inside surface of said tubular casing so as to bond said skirt portion of said basewad to said wall while maintaining said biaxial orientation of said tubular casing wall adjacent said skirt portion, a central hub portion for supporting a primer, and an annular web portion about said hub portion spacing and supporting said skirt portion from said hub portion, said web portion having an axial thickness less than 0.15 inches.

4,958,569

WROUGHT COPPER ALLOY-SHAPED CHARGE LINER

Frank N. Mandigo, North Branford, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed Mar. 26, 1990, Ser. No. 499,934
Int. Cl.[5] F42B *10/00*
U.S. Cl. 102—476 **18 Claims**

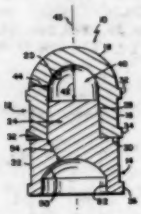
1. A wrought metal liner for a shaped charge device, said liner being shaped so as to comprise upon detonation of said device and formed from a multiple phase alloy having:
a ductile metal matrix and
a discrete second phase dispersed in said matrix wherein said second phase has a melting temperature less than the temperature reached by said liner following detonation.

4,958,570

BULLET ASSEMBLY AND METHOD OF MAKING THE SAME

David A. Harris, 601 W. 6th St., Greenfield, Ind. 46140

Filed Sep. 8, 1989, Ser. No. 405,207
Int. Cl.[5] F42B *12/02, 30/02*
U.S. Cl. 102—517 7 Claims



1. A bullet assembly comprising a two piece projectile consisting of:

a hollow cylindrical nose member having an outer and inner surface defining a hollow generally cylindrical body portion and a hemispherical end nose portion wherein a cross-section of the hollow cylindrical nose member defines a substantially U-shape with the hemispherical nose portion forming a bight of the U-shape cross-section;

a solid base member having a cylindrical body portion with an outer surface of equal diameter to a diameter of the outer surface of the cylindrical nose member and a tapered solid projection portion which is located within a cavity defined by the hollow in the generally cylindrical body portion of the nose member;

wherein the nose and base members are made from the same material;

wherein the solid projection portion of the base member is axially separated from the inner surface of the hemispherical end of the nose member to define a hollow region between the solid projection and the inner surface of the hemispherical end of the nose member;

wherein the inner surface of the cylindrical body portion of the nose member has a substantial identical taper with the taper of the solid projection so as to provide a tight fit therebetween;

wherein the solid projection is axially centered on the solid base member with its taper being axially inwardly displaced from the outer diameters of the outer surfaces of the nose and base members;

wherein an open end of the nose member abuts a flat annular ledge on the base member that extends between the taper of the projection and the outer surface of the base member to provide a close fit therebetween; and

wherein a thickness between the inner and outer surfaces of the hemispherical end nose portion of the nose member at the hollow region is substantially constant.

4,958,571

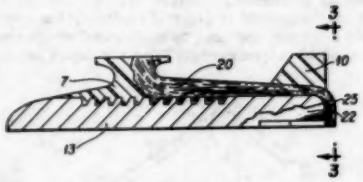
CONTINUOUS-FIBER REINFORCEMENT SABOT

Lawrence J. Puckett, Churchville, Md., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 13, 1989, Ser. No. 406,932
Int. Cl.[5] F42B *14/06*
U.S. Cl. 102—522 1 Claim

1. A sabot for a projectile, said projectile having a high ratio of length to diameter, having a base and having buttress grooves thereon;

wherein said sabot comprises grooves which mesh with said buttress grooves of said projectile; and



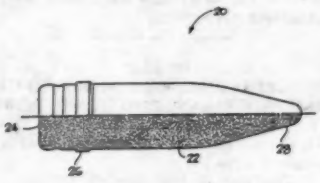
wherein said sabot is comprised of continuous filaments which wrap around the projectile base and diverge into the buttress grooves of said projectile.

4,958,572

NON-RICOCHETING PROJECTILE AND METHOD OF MAKING SAME

Yvan Martel, Loretteville, Canada, assignor to Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence of Her Majesty's Canadian Government, Canada

Filed Sep. 12, 1989, Ser. No. 406,304
Claims priority, application Canada, Feb. 24, 1989, 592121
Int. Cl.[5] F42B *13/20*
U.S. Cl. 102—529 10 Claims



1. A practice projectile for use with military aircraft and the like for training pilots in attacking ground targets, said projectile comprising:

a unitary and solid body formed from sintered sponge iron powder having a uniformly distributed porosity throughout and having a sintered density equivalent to the apparent density of a projectile to be simulated.

4,958,573

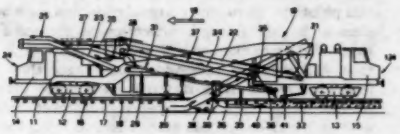
REHABILITATION MACHINE HAVING ITS FEED AND DISCHARGE OF MATERIALS AT ITS LEADING END IN THE DIRECTION OF ITS ADVANCE

Flavio Mancini, Brescia, Italy, assignor to Danieli & C. Officine Meccaniche S.p.A. and ITL/CLM Impianti Tecnici Industriali S.p.A., both of Buttrio, Italy

Filed Jul. 18, 1988, Ser. No. 220,686
Claims priority, application Italy, Aug. 7, 1987, 83434 A/87
Int. Cl.[5] E01B *29/05*
U.S. Cl. 104—2 9 Claims

1. A rehabilitation apparatus for railway road beds, comprising a rehabilitation machine including: a leading end and a trailing end relative to the direction of advance of the rehabilitation machine; a front bogie at the leading end and a rear bogie at the trailing end; a framework resting on said front and rear bogies; a cab at each said end for driving the rehabilitation machine; a hopper connected to the framework; an excavation chain for transferring excavated material through the hopper, and an elevator for receiving the excavated material transferred from the excavation chain through the hopper; and,

located at one said end, a first conveyor for delivering a mixture of aggregate materials, a second conveyor for delivering



metalling, and discharge conveyors for discharging excavated material from the machine.

4,958,574

CABLE TRANSPORT SYSTEM WITH GARAGING OF CARRIERS

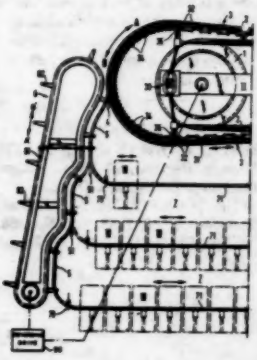
Bernd Meindl, Hard, Austria, assignor to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG, Wolfurt, Austria

Filed Nov. 17, 1989, Ser. No. 438,707

Claims priority, application Austria, Nov. 18, 1988, 2831/88

Int. Cl.[5] B61J *3/02*; B61K *1/00*

U.S. Cl. 104—88 **10 Claims**



1. A cable conveyance, comprising:

a cable transporter having a transport cable, guide means for defining a path for said cable, drive means for displacing said cable, a plurality of carriers couplable to and decouplable from said cable, and a guide rail receiving carriers decoupled from said cable for disembarking and boarding of passengers and returning decoupled carriers to said cable for recoupling thereto; and

means for garaging of said carriers, said means for garaging of said carriers including:

means forming a storage region for receiving carriers to be garaged,

a transport rail between said guide rail and said region and a drive associated with said transport rail for advancing carriers from said guide rail to said region,

at least one storage rail in said region having an end turned toward said transport rail and receiving said carriers therefrom and an opposite end remote from said transport rail,

means for mounting said storage rail to enable it to swing about a substantially horizontal axis between a position in which said storage rail is inclined downwardly away from said transport rail and said carriers move onto said storage rail by gravity and a position in which said storage rail is inclined downwardly toward said transport rail and said carriers move toward said transport rail by gravity, and

means connected with said drive for reversing same to advance carriers from said storage rail to said guide rail along said transport rail.

4,958,575

TRANSIT VEHICLE APPARATUS AND METHOD FOR SOLAR INDUCTION MONORAILS

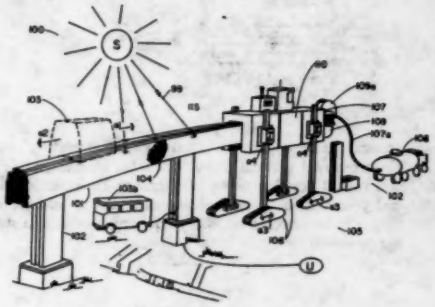
Mark J. Antosh, 4009 N. Stone Ave., Tucson, Ariz. 85705

Division of Ser. No. 174,422, Mar. 28, 1988, Pat. No. 4,885,995.

This application Dec. 7, 1989, Ser. No. 447,196

Int. Cl.[5] B60L *8/00*, *13/10*

U.S. Cl. 104—288 **5 Claims**



1. A transit vehicle apparatus adapted to be propelled along a solar energy collecting monorail structure, said transit vehicle apparatus comprising:

(a) a transverse flux motor means for magnetically coupling said monorail structure, drawing electrical energy converted by said monorail structure and producing propulsion and levitation forces, which provide power to said apparatus being propelled along said monorail structure;

(b) a fiber optical control means for communicating with said solar energy collecting monorail structure;

(c) a floor member having an omega-shaped bottom portion that conforms to an upper rail portion of said solar energy collecting monorail structure, said transverse flux motor means being housed in said omega-shaped bottom portion; and

(d) a monorail skid roller means for providing low friction contact between said transit vehicle apparatus and said solar energy collecting monorail structure.

4,958,576

FOLD-AWAY TABLE

Kurt Kaser, Ulm/Donau, Fed. Rep. of Germany, assignor to Karl Kassbohrer Fahrzeugwerke GmbH, Ulm, Fed. Rep. of Germany

Filed Jul. 10, 1989, Ser. No. 377,609

Claims priority, application Fed. Rep. of Germany, Jul. 13, 1988, 8809005

Int. Cl.[5] A47B *41/04*

U.S. Cl. 108—35 **25 Claims**

1. A fold-away table for a vehicle seat having a seat frame, said table comprising:

a mounting base defining a stationary guide structure;

means for securing said mounting base to the seat frame at a location disposed laterally from the seat with said guide structure lying in a vertical plane;

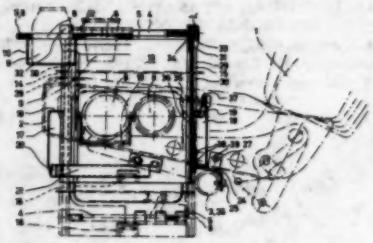
a carrier defining a housing structure with an open top, said carrier being mounted on said guide structure for displacement in said vertical plane between a lowered storage position and a raised use position;

a substantially horizontal pivot axis;

means for mounting said pivot axis on said carrier for dis-

placement in said vertical plane between a lowered position located within said housing structure at the lower end thereof, and a raised position at the open top of said housing structure; and

at least one table element mounted on said pivot axis for pivotal movement between a folded position lying in said



vertical plane, and an unfolded position extending laterally from said vertical plane, said table element when in said folded position being arranged to be lowered with said pivot axis into said housing, whereupon said carrier may then be lowered on said guide structure to said storage position.

4,958,577

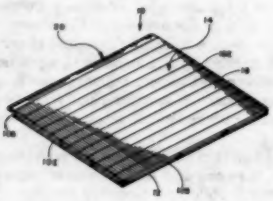
ROLL-UP LAP TRAY

Richard Demaio, 640 E. 14th St., and James Piera, 710 E. 13th St., both of, New York, N.Y. 10009

Filed Jun. 14, 1989, Ser. No. 365,683

Int. Cl.[5] A47B *23/00*

U.S. Cl. 108—43 **1 Claim**



1. A roll-up lap tray comprising:

(A) a layer of flexible material having a first surface and a second surface, said layer of flexible material being rectangular in peripheral shape and having ends and sides with said ends intersecting said sides to form corners of said rectangular shape, said flexible material having a length dimension as measured between said ends and a width dimension as measured between said sides with said length dimension being greater than said width dimension, said flexible material further including a diagonal dimension as measured between opposite corners across the center of said rectangular shape;

(B) a plurality of slats mounted on said flexible material first surface, all of said slats extending lengthwise of said flexible material and each slat having a length that is essentially equal to said flexible material length dimension, all of said slats being independent of each other so that said flexible material can be rolled into a cylindrical shape.

(C) a pivot pin connected to one of said slats and extending through said layer of flexible material at the center thereof;

(D) a brace assembly connected to said pivot pin and being located adjacent to said flexible material second surface and including

(1) two brace elements, each brace element including ends and each brace element being pivotally connected to said pivot pin intermediate to said ends, and each brace element having a length dimension as measured between said brace element ends which is just slightly less than said diagonal dimension and longer than said length of said flexible material, each brace element further including a snap-receiving chamber defined near each end, one of said brace elements being located immediately adjacent to said layer of flexible material and being located between said layer of flexible material and the other brace element.

(2) snap elements on selected ones of said slats and which extend through said flexible material and being located adjacent to each said corner so that said brace elements form an X-shape with said brace elements extending transversely across said slats when said snap elements are received in said snap-receiving chambers,

(3) a third brace element which includes ends and which is pivotally connected to said pivot pin intermediate to the ends of said third brace element, said third brace element having a length dimension as measured between the ends of said third brace element which is essentially equal to said flexible material width dimension, and

(4) a lip element attached to one of said slats and extending along one side edge of said flexible material for essentially the entire length of said flexible material; and

(E) a carrying container which includes a hollow, cylindrical body having a blind-ended bore defined therein and a handle on said cylindrical body.

4,958,578

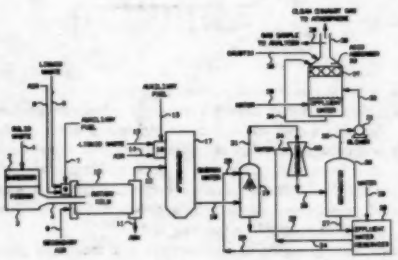
DRUMMED WASTE INCINERATION

Clarence G. Houser, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation of Ser. No. 8,975, Jan. 30, 1987, abandoned. This application Aug. 30, 1988, Ser. No. 238,502

Int. Cl.[5] A47J *36/00, 36/24*

U.S. Cl. 110—246 **49 Claims**



1. Apparatus for the disposal of waste material kept within metal container, said apparatus comprising:

a shredder for the metal container;

first conveyor means for introducing the metal container, holding the waste material, into said shredder;

means for producing a mixture of waste material and metal shreds;

a primary combustion chamber for the mixture of waste material and metal shreds;

second conveyor means for feeding said mixture of waste material and metal shreds from said shredder into said primary combustion chamber;

means for burning said mixture of waste material and metal shreds in said primary combustion chamber wherein ash,

decontaminated metal shreds, and primary combustion gases containing combustible residue material, are produced in said primary combustion chamber;

a secondary combustion chamber for the primary combustion gases;

first conduit means, in fluid flow communication between said primary combustion chamber and said secondary combustion chamber, for introducing the primary combustion gases into said secondary combustion chamber, said first conduit means defining a flow path from said primary combustion chamber to said secondary combustion chamber;

means for withdrawing ash and decontaminated metal shreds from said primary combustion chamber;

means for burning combustible residue, contained in the primary combustion gases, in said secondary combustion chamber, wherein hot secondary combustion gases containing entrained ash and particulates are produced in said secondary combustion chamber; and

means for introducing liquid waste material into said secondary combustion chamber.

4,958,579

SEWING DEVICE FOR MATTRESSES OR CUSHIONS

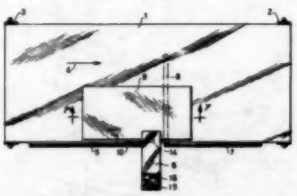
Antonius M. De Weers, Middenhavenstraat 5, 1976 CK, Ijmuiden, Netherlands

Filed Feb. 24, 1989, Ser. No. 314,933

Claims priority, application Netherlands, Feb. 26, 1988, 8800505

Int. Cl.[5] D05B *11/00, 21/00*

U.S. Cl. 112—2.1 **9 Claims**



1. Device for sewing with a sewing needle, along the edges of a mattress or cushion, cover material covering the top and bottom of the mattress to cover material covering the sides of the mattress, comprising supporting face means which is movable for moving the mattress relative to said sewing needle, said sewing needle adapted to be pushed through the cover material which covers the edge area of the top or bottom of the mattress and the cover material which covers the adjacent edge area of the side of the mattress, which mattress is resting on said supporting face means, a swingable arm adapted to be swung between a position parallel to and a position essentially perpendicular to the direction of movement of said supporting face means, whereby, in the latter position, at least the part of said arm near the swivel point is lying beyond said sewing needle in the direction of movement of said supporting face means, first sensor means located near the swivel point for detecting a hindmost mattress corner in the direction of movement of said supporting face means, and holding means for holding the mattress at said corner; said sensor means and the drive units for said sewing needle, said supporting face means, said holding means and said swingable arm being connected to a control device means for stopping said sewing needle and said supporting face means on detection of a mattress corner and for bringing said holding means and said swingable arm into said operating position so that the mattress can be swung about the held corner, and means for subsequently returning said holding means and said arm to the idle position again.

4,958,580

SEWING MACHINE LATERAL FEED APPARATUS

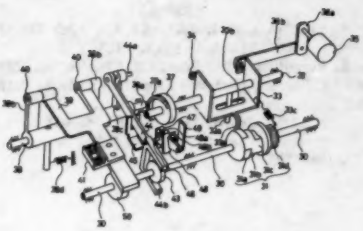
Yutaka Asaba, Tokyo, and Masaharu Chikamura, Kawasaki City, both of Japan, assignors to Juki Corporation, Tokyo, Japan

Filed Jan. 27, 1989, Ser. No. 303,535

Claims priority, application Japan, Jan. 29, 1988, 63-11799

Int. Cl.[5] D05B *27/02*

U.S. Cl. 112—314 **4 Claims**



1. In a sewing machine, an apparatus for moving a feed dog in a lateral direction, comprising:

a frame;

a first shaft rotatably mounted on said frame to extend in said lateral direction;

a second shaft mounted on said frame to extend in said lateral direction;

a cam follower mounted on said first shaft;

cam means for rotating said cam follower about said first shaft;

means for transmitting rotation of said cam follower to said first shaft;

converting means including a face cam secured to said first shaft to engage with an end of said second shaft for converting rotation of said first shaft into axial movement of said second shaft;

a feed dog bracket rotatably mounted on said second shaft for mounting a feed dog thereon.

4,958,581

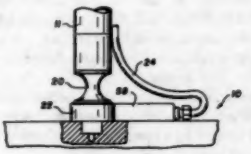
SAILBOARD APPARATUS

Ian Denison, 1210 West King Edward Ave., Vancouver, British Columbia, Canada V6H 1Z7

Filed Jan. 27, 1989, Ser. No. 303,475

Int. Cl.[5] B63H *9/10*

U.S. Cl. 114—93 **4 Claims**



1. In a sailboard provided with a mast the improvement comprising;

force responsive means connected to said mast and said sailboard for providing first and second output signals corresponding to the shearing forces acting between said mast and said sailboard in the longitudinal direction of said sailboard and in the transverse direction of said sailboard, respectively;

indicator means responsive to said first and second output

signals for providing indications representing said shearing forces;

said force responsive means comprising means connecting said mast to said sailboard;

means for forming a universal joint between said mast and said sailboard; and

means connecting said mast to said universal joint;

said force responsive means comprising means connecting said universal joint to said sailboard.

4,958,582

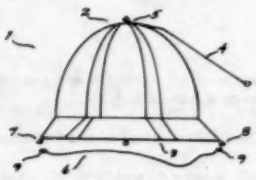
SPINNAKER SAIL FOR KAYAKS, CANOES OR OTHER SMALL WATER CRAFT

James L. Vermillion, SR-1 Box 2425, Chugiak, Ak. 99567, and Sally M. Forrest, 1385 Bay Laurel Dr., Menlo Park, Calif. 94025

Filed Jun. 1, 1987, Ser. No. 55,943

Int. Cl.[5] B63H *9/04*

U.S. Cl. 114—103 **11 Claims**



1. an improved spinnaker sail for kayaks and other small watercraft comprising:

a. a sail, having a top and a bottom, and having a generally triangular shape, said sail being oriented such that the base of the triangle is at the bottom of the sail, said bottom of said sail also having a first corner located at one end of said bottom of said sail, and a second corner, located at the opposite end of said bottom of said sail;

b. a mast;

c. anchor means to removably secure said mast to said kayak or small watercraft;

d. a sheet having a first clip and a second clip, said clips being located at opposite ends of said sheet, said first clip being removably attached to the first corner and said second clip being removably attached to the second corner of said bottom of said sail, thereby forming a loop, said sheet being used to secure said bottom of said sail and to restrain said sail from freely moving in the wind;

e. a backstay fixedly attached to the top of said sail, said backstay being used to secure said top portion of said sail to said water craft, said backstay also being slidably connected to said mast and fixedly attached to the rear portion of said kayak or said watercraft, such that said backstay exerts a vertical compression force on said mast when the sail is fully loaded;

f. clip means to slidably fasten said backstay to said mast, said clip means being such that said backstay can be quickly inserted therein and removed therefrom without disassembly of said mast.

4,958,583

WATER SKI SAFETY APPARATUS

Bruce T. Renouard, 4430 Cedarbrush Dr., Dallas, Tex. 75229

Filed Apr. 10, 1989, Ser. No. 335,780

Int. Cl.[5] A63C *15/06*

U.S. Cl. 114—253 **13 Claims**

1. Water ski safety apparatus for use with a boat, comprising:

a first coupler for connecting the apparatus to a handle;

a second coupler for connecting the apparatus to the boat;

deceleration means for decelerating said apparatus when the apparatus is caused to move toward the boat; and

wherein a first rope extends between the handle and a first end of said apparatus, a second rope extends between the

boat and a second end of the apparatus, and said deceleration means includes actuation means for actuating the deceleration means, said actuation means being responsive to a reduction in tension placed on said apparatus by said first and second ropes.

4,958,584

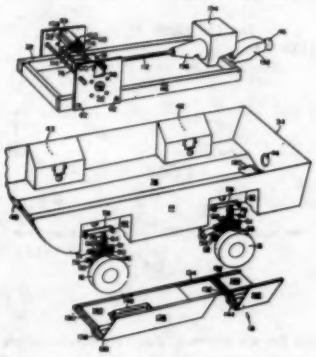
AMPHIBIOUS VEHICLE HAVING AN EFFICIENT WATER-BORNE OPERATIONAL MODE

Roger L. Williamson, San Antonio, Tex., assignor to MPV, Inc., San Antonio, Tex.

Continuation-in-part of Ser. No. 127,800, Dec. 2, 1987, Pat. No. 4,838,194. This application Feb. 9, 1989, Ser. No. 310,207

Int. Cl.[5] B60F *3/00*

U.S. Cl. 114—270 **16 Claims**



1. An amphibious vehicle comprising:

a body having an interior portion and wheel wells;

at least three wheels located within said wheel wells; suspension means for attaching said wheels to said body, each wheel

having one of said suspension means wherein said suspension means comprises:

at least one support member having first and second ends, said first end being pivotally mounted to said body, and said second end being pivotally mounted to one of said wheels;

a shock absorber member having first and second ends, said first end of said shock absorber member being attached to said second end of said support member, and said second end of said shock absorber member being attached to a retraction means.

means for steering said wheels;

engine/transmission means for impelling at least one of said wheels;

means for retracting said wheels from a lowered position to a raised position, and for lowering said wheels from said raised position to said lowered position wherein said retraction means comprises:

a linkage member having first and second ends, said first

end of said linkage member being attached to said second end of said shock absorber member;

means for imparting horizontal motion to said linkage member, said second end of said linkage member being attached to said imparting means, whereby lateral movement of said linkage member causes said shock absorber member to raise said support member, which in turn raises said wheel, wherein said linkage member has a threaded aperture at said second end, and said means for imparting horizontal motion to said linkage member comprises:

a worm gear having first and second ends, said first end being inserted into said threaded aperture of said linkage member;

a motor, rotatably coupled to said second end of said worm gear, whereby energization of said motor causes said worm gear to rotate, said rotation force being converted to translational force by the action of said first end of said worm gear in said threaded aperture of said linkage member;

hull means for covering said wheel wells when said wheels are in said raised position, wherein said hull means comprises:

a front hull section;

a rear hull section; wherein said front and rear hull sections each have means for sealing said wheel wells, thereby substantially preventing water from entering said wheel wells;

means for connecting said front and rear hull sections, said front and rear hull sections being slidably attached to said side of said body whereby, when said front and rear hull sections are in a first position, said wheel wells are exposed and said wheels may contact a supporting roadway and, when said front and rear hull sections are in a second position, corresponding to said raised position of said wheels, said front and rear hull sections cover said wheel wells;

means for moving said front and rear hull sections between said first and second positions wherein said means for moving said front and rear hull sections comprises a double action hydraulic cylinder;

a plurality of linkage housings, each integral with a vertical mounting plate attached to said body, one of said linkage housings for each of said wheels, said linkage member having a rectangular cross-section, said linkage housing further having a rectangular cross-section therein for passage of said linkage member therethrough, said linkage housing providing support of and a track for said linkage member; and

means for propelling the vehicle in water.

4,958,585

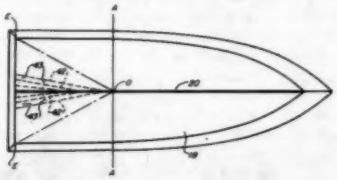
BOAT HULL

James D. Caldwell, Jr., Cloud, Fla., assignor to Skeeter Products, Inc., Kilgore, Tex.

Filed Jul. 11, 1988, Ser. No. 217,472

Int. Cl.[5] B63B *1/18*

U.S. Cl. 114—271 **16 Claims**



1. A boat hull having a bottom surface which is generally V-shaped in transverse cross section, said bottom surface having a keel, a stern end and a bow end, said bottom surface further having a deadrise angle that progressively increases from said stern end to a vertical plane forward at said stern end, each transverse cross section of said bottom surface between said stern end and said forward vertical plane being convex, and wherein that portion of said bottom surface extending from a first location, corresponding to the intersection of said keel with said forward vertical plane, to a plurality of second locations, corresponding to the intersection of an edge of the bottom surface with said stern end, is shaped so that the lift to the hull is constant at any point along plural water travel lines, extending along the bottom surface of said hull from said first location to said plurality of second locations, which water travel lines are traversed by water during forward movement of said boat hull through the water.

4,958,586

FOLDING ANCHOR

John S. Stupakis, Orange, Calif., assignor to JSS Scientific Corporation, Orange, Calif.

Filed Nov. 3, 1988, Ser. No. 266,801

Int. Cl.[5] B63B *21/44*

U.S. Cl. 114—297 **23 Claims**

1. An anchor comprising:

first and second fluke retaining assemblies, each of said retaining assemblies including a generally identical generally C-shaped retaining member having first and second oppositely disposed generally parallel short legs and an interconnecting elongate bight portion;

hinge means secured to the distal ends of a short leg of each of said retaining members for enabling pivoting of said retaining members between a first folded position and a second unfolded position, said retaining members in said first position having the distal ends of the other short arms in edge abutting relation to define a generally rectangular opening, and said retaining members in said second position having the short legs with the hinge in generally parallel spaced relation;

shank means having a bar-shaped end of a thickness approximately equal to the spacing between adjacent short legs with said first and second retaining members pivoted to said first position;

means for attaching said end of said shank means in surface abutting relation to the exterior of a short leg for enabling said one end to be in surface abutting relation with the exterior of the adjacent short leg with said retaining members in said first position;

first and second fluke assemblies, each of said fluke assemblies being coupled for pivoting between the short legs of one of said retaining members for pivoting about an axis

generally parallel to the elongate bight portion, with the pivot axis of one of said fluke assemblies being in axial alignment with the pivot axis of the other fluke assembly with said retaining members pivoted to said first position; and

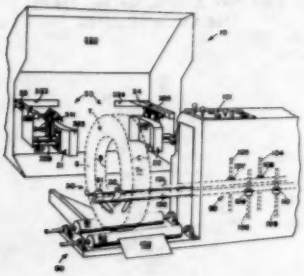
means for locking said retaining members in said first position.

4,958,587

APPARATUS FOR EXTERIORLY PAINTING AND INTERIORLY COATING TIRES

Robert D. Fogal, Sr.; Robert D. Fogal, Jr., and George E. D. Morgan, all of Chambersburg, Pa., assignors to International Marketing, Inc., Chambersburg, Pa.

Filed Jun. 29, 1989, Ser. No. 373,361
Int. Cl.[5] B05C *1/02*; B05B *13/06*
U.S. Cl. 118—206 **29 Claims**



1. Apparatus for painting the exterior sidewall surfaces of a tire comprising means for rotating a tire about its axis, a carriage, said carriage including first and second paint applicator carrying arms carrying respective first and second paint applicators for applying paint to exterior sidewall surfaces of a tire during the rotation thereof, said paint applicator carrying arms being disposed in generally parallel relationship to each other, first means mounting said paint applicator carrying arms upon said carriage for reciprocal sliding movement toward and away from each other in a first reciprocal movement direction, first means for selectively moving said paint applicator carrying arms toward and away from each other in said first direction thereby accommodating tires of different width between said paint applicators, second means mounting said paint applicator carrying arms upon said carriage for reciprocal sliding movement in a second reciprocal movement direction generally normal to said first direction and to said tire axis, second means for selectively reciprocally moving said paint applicator carrying arms toward and away from said tire axis in said second direction thereby accommodating tires of different diameters between said paint applicators, and third means for selectively reciprocally moving said carriage in a third reciprocal movement direction generally normal to said second direction thereby accommodating tires of different heights.

4,958,588

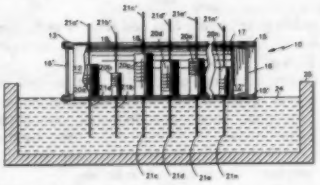
SOLDER-COATING FIXTURE AND ARRANGEMENT

Steven Hutchison, Centereach, and Leonard Bruno, Islip, both of N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 28, 1989, Ser. No. 344,785
Int. Cl.[5] B05C *3/02*
U.S. Cl. 118—423 **10 Claims**

1. A fixture for solder-coating respective end portions of elongated components that are loaded in the fixture in a molten solder bath, comprising

means for maintaining the fixture afloat in a predetermined position on an upper surface of the molten solder bath even when fully loaded, including at least one solid supporting wall having at least one opening therein for the passage of one of the end portions of a respective component therethrough and kept from sinking into the molten solder bath solely by surface tension effective between said solid supporting wall and the molten solder bath in said predetermined position of the fixture; and



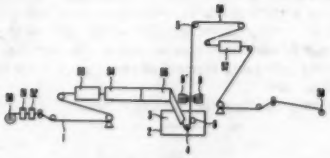
means for holding the respective component on said supporting wall in a position in which the respective end portion thereof passes through said opening and, when the fixture floats in said predetermined position on the molten solder bath, into the molten solder bath to a depth necessary for the molten solder to coat the respective end portion to the desired extent.

4,958,589

CONTINUOUS MELT-PLATING APPARATUS

Masatoshi Homma; Teruo Yamaguchi, both of Hitachi, and Tuneyuki Hasegawa, Hiratsuka, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 28, 1989, Ser. No. 329,821
Claims priority, application Japan, Mar. 30, 1988, 63-74361
Int. Cl.[5] B05C *3/12*
U.S. Cl. 118—672 **8 Claims**



1. A continuous melt-plating apparatus having:

a plating melt bath,

a sink roller disposed in the plating melt of said plating melt bath for conveying a steel strip wound thereon and serving as a material to be plated,

gas wiping nozzles located above said plating melt bath and respectively disposed adjacent to a front surface and a rear surface of said steel strip so as to blow off and wipe off part of the plating melt attached to the front surface and rear surface of said steel strip to adjust the plating thereon to a desired thickness

the continuous melt-plating apparatus comprising:

a guide roller having at least a part thereof immersed in said plating melt bath, and disposed on the opposite side of said steel strip from said sink roller, between said nozzle and said sink roller, and

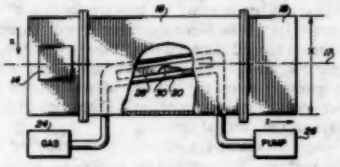
adjustment means for bending said guide roller in the widthwise direction thereof so as to be capable of pushing said steel strip with a force varied in the widthwise direction of said steel strip.

4,958,590

MICROWAVE TRAVELING-WAVE DIAMOND PRODUCTION DEVICE AND METHOD

Robert R. Goforth, Encinitas, Calif., assignor to General Atomics, San Diego, Calif.

Filed Sep. 6, 1989, Ser. No. 403,335
Int. Cl.[5] C23C 16/50
U.S. Cl. 118—723 **22 Claims**



1. Apparatus for depositing diamond comprising:

a waveguide structure, said waveguide structure including an elongate waveguide section having a first end, a second end, and a length therebetween, and defining a substantially internal uniform cross section at all points along the length of the section;

a reaction tube disposed within said waveguide section;

at least one substrate plate disposed within said tube and extending substantially in the longitudinal direction thereof;

means for maintaining a gaseous mixture within said tube at a prescribed pressure, said gaseous mixture having a composition that promotes the deposition of diamond on said at least one substrate when exposed to said microwave energy;

means for applying microwave energy at the first end of said waveguide section for causing a traveling wave of microwave energy to pass lengthwise through said waveguide section to create plasma in said gaseous mixture, heating said gaseous mixture and said at least one substrate, said traveling wave being propagated in a TE_{mn} mode wherein the transverse electric field thereof has a magnitude that varies within a given cross section of the waveguide section from zero at the waveguide structure to at least one maxima within said cross section, and wherein said at least one maximum decreases in amplitude with distance from the first end of the waveguide section; and

said reaction tube extending generally in the longitudinal direction of said waveguide section but obliquely thereof with the interior of said tube in a region of substantially constant power absorption through said waveguide section.

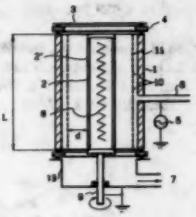
4,958,591

APPARATUS FOR FORMING A FUNCTIONAL DEPOSITED FILM BY MEANS OF PLASMA CHEMICAL VAPOR DEPOSITION

Itaru Yamazaki, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 71,335, Jul. 2, 1987, abandoned. This application Mar. 13, 1989, Ser. No. 323,202
Claims priority, application Japan, Jul. 4, 1986, 61-157611
Int. Cl.[5] C23C 16/50
U.S. Cl. 118—723 **1 Claim**

1. In a capacitive-coupled type plasma chemical vapor deposition apparatus for forming a light receiving layer on a cylindrical substrate so as to produce a photosensitive member for use in electrophotography, which includes a substantially enclosed deposition chamber having a film forming space surrounded by a circumferential wall functioning as a cathode, means for receiving a cylindrical substrate which functions as an anode in the film forming space disposed on at least one of an upper wall and a bottom wall, a gas supplying means for introducing film forming raw material into said film, forming space, a power source electrically connected to said cathode and said anode capable of creating discharge in said film forming space, and an exhausting means for removing gases from said film forming space, wherein the improvement comprises



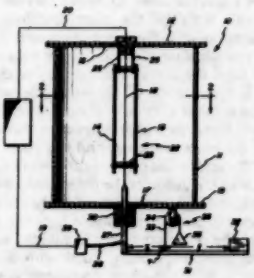
the length L of said cathode to be in the range of from 700 to 1400 mm and said means for receiving said cylindrical substrate provides that the interval d between the inside face of said cathode and the surface of said anode is to be in the range of from 60 to 80 mm.

4,958,592

RESISTANCE HEATER FOR DIAMOND PRODUCTION BY CVD

Thomas R. Anthony, Schenectady; Robert C. DeVries, Burnt Hills; Richard A. Engler; Robert H. Ettinger, both of Schenectady, and James F. Fleischer, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 22, 1988, Ser. No. 234,773
Int. Cl.[5] C23C 16/46
U.S. Cl. 118—724 **8 Claims**



1. An apparatus adapted for use in the practice of a CVD process comprising in combination

(a) a reaction chamber having opposite upper and lower closed end walls,

(b) a gas inlet and exhaust means in said end walls to introduce a gas into said chamber and to withdraw gas therefrom,

(c) a vertical pair of parallel spaced apart planar oppositely facing substrate surfaces suspended from the upper closed end wall of the reaction chamber and positioned in said reaction chamber so that gas from said gas inlet means may flow between said surfaces and exit from said gas exhaust means,

(d) vertical hester means positioned between said substrate surfaces and spaced therefrom a predetermined distance coextensive with said surfaces to heat the gas flowing between said surfaces, and

(e) weight balancing means, for maintaining the spaced relationship of the vertical heater means from the surfaces, suspended from the upper closed end wall of the reaction chamber by means of a cable passing over a pulley member attached to the lower closed end wall of the reaction chamber.

4,958,593

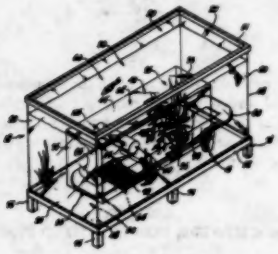
VIVARIUM

James P. Hurlburt, 8874 Cypress Ave., and Michael R. Lagasse, 17333 Valley Blvd., both of Fontana, Calif. 92335

Filed Jun. 20, 1988, Ser. No. 209,333

Int. Cl.[5] A01K *63/00*

U.S. Cl. 119—5 **9 Claims**



1. A vivarium comprising:

(a) a bottom wall;

(b) upstanding, substantially transparent outer side walls which in cooperation with the bottom wall form an outer container;

(c) upstanding, substantially transparent inner side walls which in cooperation with the bottom wall form a single inner container, the inner container also having an enclosing top wall, such that the inner container is not in fluid communication with the outer container; and

(d) at least one substantially transparent tube member forming a dry tube, the said at least one dry tube connecting an opening at one portion of the inner side walls to another opening at another portion of the inner side walls, with the said at least one dry tube extending through the space between the inner container and the outer container, the inside of the said at last one dry tube being in fluid communication with the inside of the inner container; wherein the top of the outer side walls extend higher than the top wall of the inner container; the space between the inner container and the outer container is adapted to for use as an aquarium, capable of being filled with water to a level above the top of the inner container; a portion of the bottom wall inside the inner container having at least one access opening therethrough; the inside of the inner container being in fluid communication with the atmosphere; and the inner container being adapted for use as a terrarium.

4,958,594

MODULAR TACK ROOM

Billy H. Swagerty, Eugene, Oreg., assignor to Carl E. O'Bryant and Linda K. O'Bryant, both of Veneta, Oreg.

Filed Dec. 20, 1989, Ser. No. 453,701

Int. Cl.[5] A01K *29/00*; B60P *3/04*

U.S. Cl. 119—7 **11 Claims**

1. A modular tack room, comprising:

a. a wall hanger assembly which includes:

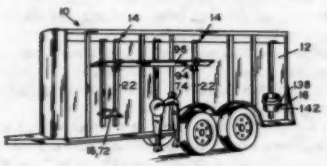
(1) an elongated vertical member having a top and bottom, and a front, a back and two sides;

(2) a plurality of receiving clip members attached to the vertical member at its front and extending upwards in a substantially parallel relationship to the vertical member, the plurality of receiving clip members being spaced along the length of the vertical member;

(3) a horizontal member attached to the top, and extending to the front, of the vertical member and, said horizontal member having connecting means formed therein; and

(4) a L-shaped member, having on a horizontal, first leg, connecting means formed for adjustable connection with the connecting means of said horizontal member atop the vertical member, and being formed so that when said connecting means are joined, a vertical, second leg of the L-shaped member will extend downwards a spaced distance from the back of the vertical member, an available adjustment of said adjustable connection being the amount of said spaced distance between the second leg of the L-shaped member and the back of the vertical member;

(5) wherein a clamp-type arrangement is formed between the L-shaped member and the back of the vertical member so as to grip the upper portion of a wall and allow the elongated vertical member with receiving clips to hang therefrom;



b. at least one hanging component, with an inner end and an outer end, having means of mounting said inner end to the front of the vertical member, which include:

(1) a vertical mounting plate of thickness less than the space between the receiving clip member and the front of the vertical member, so as to fit downward between the upwardly extending receiving clip member and the front of the vertical member;

(2) two guide members, attached to and extending horizontally from the vertical mounting plate, which are laterally separated from each other by a space slightly greater than the width of the vertical member, so that with the vertical mounting plate inserted into the receiving clip space, the guide members embrace the sides of the vertical member, so as to limit lateral movement and rotation of the hanging component; and

(3) a lower support member, positioned below the engagement of the mounting plate and the receiving clip and formed to contact the front of the vertical member and thus provide support against the levered weight of the hanging component any load thereon.

4,958,595

DISPOSABLE BIRD FEEDER

Elaine A. Richman, 6102 Ivydene Ter., Baltimore, Md. 21209, and Darrell D. Fish, Baltimore, Md., assignors to Elaine A. Richman, Baltimore, Md.

Filed Nov. 3, 1989, Ser. No. 431,085

Int. Cl.[5] A01K *39/01*

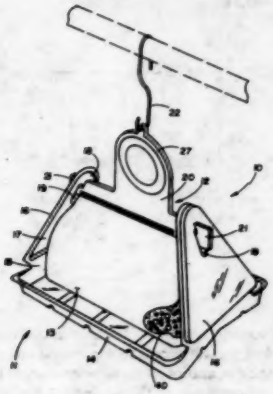
U.S. Cl. 119—52.2 **30 Claims**

1. A disposable bird feeder which is compact, easily assembled, and may be discarded when the feed is consumed, comprised of:

a substantially flat tray including a pair of spaced-apart opposite side walls, the side walls being flexibly joined to the tray such that side walls may be laid out flat for storage and may be folded to form upwardly-extending side

walls, each of the side walls having a lower portion integrally joined to the tray and an upper portion located above the tray;

a central section including a horizontal member having respective opposite ends, each of said opposite ends being joined to a respective upper portion of a respective side wall of the tray, thereby supporting the tray from the central section, the central section further including



means thereon for supporting the disposable bird feeder; and

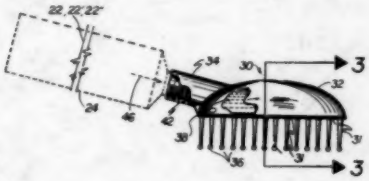
a separate pouch of bird feed supported by the central section independently of the side walls and of the tray, the pouch depending from the central section between the side walls and above the tray, wherein the pouch may be punctured to allow release of the bird feed from the pouch and onto the tray.

4,958,596

PET GROOMING KIT WITH APPLICATOR

Katalin Belan, 2450 NE. 135th St., #705, North Miami, Fla. 33181

Filed Dec. 26, 1989, Ser. No. 457,149
Int. Cl.[5] A01K *13/00*
U.S. Cl. 119—86 **9 Claims**



1. A pet grooming kit for use in applying shampoo, flea pesticides and other related liquid substances to an animal's coat, comprising:

a. A portable carrying case including an interior compartment and an exterior shell structure having a handle attached thereto,

b. a plurality of containers formed of a flexible material, for containment of a liquid therein, each of said containers having an elongate body with a threaded tubular spout formed at an upper distal end thereof,

c. a liquid applicator means including a head portion and a tubular neck portion having a threaded interior surface adapted for threaded engagement with said threaded tubular spout, said head portion including a hollow interior defining a reservoir for receiving liquid from a container,

d. said tubular neck portion on said liquid applicator means being formed and configured for liquid receiving engagement with said tubular spout on each of said plurality of containers,

e. a plurality of bristles connected to an extending outwardly from a bottom surface of said head portion in perpendicular relation thereto, said plurality of bristles arranged in a plurality of rows in spaced relation throughout the bottom surface,

f. each of said bristles including an interior vein extending axially through the entire length of a bristle and in liquid receiving relation to the hollow interior of said liquid applicator means and being structured to permit passage of liquid therethrough, and

g. liquid disbursing means including a hollow sphere disposed on a distal end of each of said plurality of bristles in liquid receiving relation to said interior vein, said hollow sphere including a plurality of small apertures structured and configured to evenly disburse the liquid in a multidirectional manner as the liquid exits from within the vein.

4,958,597

PET RESTRAINT

Richard C. Mildner, 1040 San Dequito Dr., Encinitas, Calif. 92024

Filed Dec. 4, 1989, Ser. No. 444,991
Int. Cl.[5] A01K *1/00*
U.S. Cl. 119—109 **2 Claims**

1. A pet restraint comprising:

(a) a leash having an upper and lower end and a clip on its lower end for clipping onto the collar of a pet;

(b) the upper end of said leash branching into two leash portions of substantially equal lengths;

(c) the upper ends of said leash portions having means to engage respectively restraints on the opposite sides of the bed of a pickup truck;

(d) means releasibly fastening said leash portions together along at least portions of their length such that said restraint mode can be used in a leash mode;

(e) said means to engage at least one of said leash portions being a loop for use as a hand grip in said leash mode;

(f) said means to restrain on each of said leash portions being a loop, and said loops overlying one another when in said leash mode to define a double-stranded hand grip grippable by a single hand; and,

(g) said means releasably fastening said leash portions comprising mating patches of hook-and-loop fastener material mounted on respective opposite surfaces of said leash portions.

4,958,598

ENGINE EMISSIONS CONTROL APPARATUS AND METHOD

Dwayne Fosseen, Radcliffe, Iowa, assignor to Midwest Power Concepts, Ltd., Radcliffe, Iowa

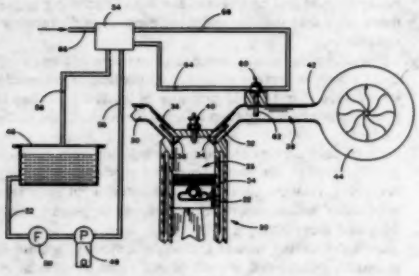
Filed Oct. 10, 1989, Ser. No. 419,254
Int. Cl.[5] F02B *75/12*
U.S. Cl. 123—1 A **16 Claims**

1. Apparatus for reducing the emissions of a diesel engine, comprising:

(a) a hydrous alcohol fuel of between about 33 percent and

about 70 percent alcohol by volume and between about 30 percent and 67 percent water by volume;

(b) a fuel injector for delivering said hydrous alcohol fuel for combustion in the engine; and



(c) means for controlling the delivery of said fuel to the engine in response to operating conditions of the engine, such that said fuel is delivered for combustion only when the engine is being operated to increase the rate of engine revolutions and when the engine is being operated substantially to maintain the rate of engine revolutions.

4,958,599

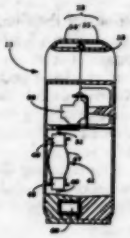
COOLING DEVICE FOR ENGINE

Yoshiharu Yokoyama, and Shigeru Akiyama, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Iwata, Japan

Filed Sep. 11, 1989, Ser. No. 405,472

Int. Cl.[5] F01P *11/20*

U.S. Cl. 123—41.5 6 Claims



1. In a cooling system for an internal combustion engine mounted within a casing and powering an electrical generator, said internal combustion engine having a cooling jacket, a heat exchanger, conduit means for communicating liquid flow between said engine cooling jacket and said heat exchanger, the improvement comprising an elastic expansion chamber supported directly by said casing and communicating said cooling system for receiving and containing the varying volumes of coolant as the coolant expands and contracts due to temperature variations.

4,958,600

LIQUID COOLING SYSTEM FOR A SUPERCHARGED INTERNAL COMBUSTION ENGINE

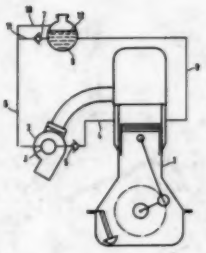
Ingo Janthur, Russelsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 2, 1990, Ser. No. 474,286

Claims priority, application Fed. Rep. of Germany, Feb. 17, 1989, 3904801

Int. Cl.[5] F01P *7/14*

U.S. Cl. 123—41.31 2 Claims



1. A liquid cooling system for an internal combustion engine having a cooling circuit arranged for forced circulation cooling during engine operation, a turbosupercharger for charging the engine and connected to the engine cooling circuit via an inlet flow pipe and a return flow pipe, and an expansion tank for cooling liquid in the cooling system in which the cooling circuit is adapted to contain a predetermined amount of liquid so as to define a desired cooling liquid level in the expansion tank, characterized in that the inlet flow pipe (4) of the turbosupercharger (2) contains a check valve (5) and a return flow pipe (6) of the turbosupercharger (2) connects with a first branch pipe (10) flowing into the expansion tank (8) above the cooling liquid level (12) and a second branch pipe (11) flowing into the expansion tank (8) below the cooling liquid level (12) and containing a check valve (7).

4,958,601

VALVED PISTON WITH ROCKER ARM JOURNALED TO PISTON

H. Clayton Lyons, P.O. Box 1737, Brookings, Oreg. 97415

Filed Sep. 19, 1988, Ser. No. 249,873

Int. Cl.[5] F01L *11/00*

U.S. Cl. 123—47 R 3 Claims

1. In a two cycle internal combustion engine the combination of,

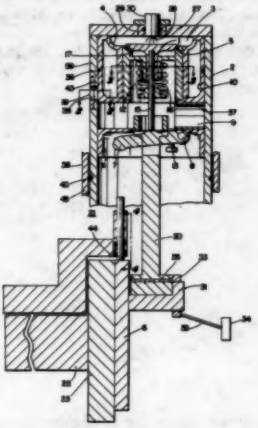
cylinder,

a movable piston in the cylinder,

an intake valve in the head of the piston,

at least one push pin impinging on said intake valve,

a rocker arm journaled to the piston and engaging an end of said push pin, and



cam means engaging the rocker arm and operative to pivotally move said arm whereby said push pin is moved vertically to sequentially open and close said intake valve.

4,958,602

INTERNAL COMBUSTION ENGINE

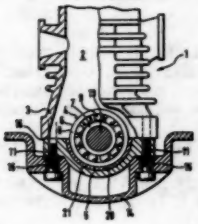
Klaus Höppner, Marbach; Reinhard Friedrich, Waiblingen, and Hermann Weiss, Steinheim, all of Fed. Rep. of Germany, assignors to Andreas Stihl, Waiblingen, Fed. Rep. of Germany

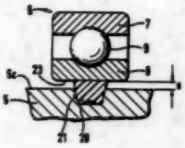
Filed Oct. 20, 1989, Ser. No. 424,821

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1988, 3836272

Int. Cl.[5] F02F *7/00*

U.S. Cl. 123—195 C **16 Claims**





1. An internal combustion engine such as a two-stroke engine for portable handheld tools such as a motor-driven chain saw, cutoff machine, brushcutter or the like, the internal combustion engine including a crankshaft and comprising:

an engine block including a cylinder and crankcase upper part extending from said cylinder;

a bearing cover connected to said crankcase upper part so as to define a partition interface therebetween;

said crankcase upper part and said bearing cover conjointly defining a bearing seat at said interface;

a crankshaft bearing seated in said bearing seat for rotatably journalling the crankshaft therein;

said bearing cover being made of a material having a thermal expansion coefficient greater than said bearing thereby causing a clearance to develop between said cover and said bearing in the presence of heat developed in the engine during the operation thereof;

receiving space means formed to extend over at least a portion of said bearing seat so as to define a receiving space between said bearing cover and said bearing;

an annular segment disposed in said receiving space; and,

said annular segment having a thermal expansion coefficient selected so as to cause aid annular segment to expand during operation of the engine and fill out said clearance thereby applying a holding force to said bearing.

4,958,603

BRACE FOR CONNECTING AN AUXILIARY COMPONENT TO AN INTERNAL COMBUSTION ENGINE

Karl-Heinz Heimer, Trebur, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 5, 1990, Ser. No. 474,867

Claims priority, application Fed. Rep. of Germany, Feb. 22, 1989, 8902070[U]

Int. Cl.[5] F16M *13/00*; F02B *67/00*

U.S. Cl. 123—195 A **5 Claims**

1. Brace for connecting an auxiliary component such as a generator to an internal combustion engine wherein the brace is provided with recesses in respective regions having respective brace attachment points for accepting respective attachment elements that can be connected to each of the component and engine and are braced between a head of the attachment element and the respective auxiliary component and engine, characterized in that the brace in the region of each attachment point between the head of the attachment element and the brace as well as between the brace and the respective component and engine has, in each case, a spherical segment adjacent to the brace and a ball cup on the head and adjacent to the respective component and engine, the spherical segment on a side thereof turned towards the attached ball cup having an arch directed towards it, the ball cup having a corresponding matching arch, and each of the spherical segments and the respective ball cups having recesses for accepting the attachment element, the recesses in the spherical segments being

larger than the size of the part of the attachment element that penetrates them, and the recess of at least one brace attachment point in its longitudinal direction being greater in size than that part of the attachment element penetrating it.

4,958,604

DIRECT FUEL INJECTION TYPE SPARK IGNITION INTERNAL COMBUSTION ENGINE

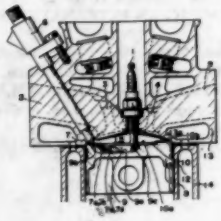
Eiji Hashimoto, Suzuka, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Jan. 30, 1989, Ser. No. 303,940

Claims priority, application Japan, Feb. 10, 1988, 63-27693; Feb. 12, 1988, 63-16266

Int. Cl.[5] F02B 23/10

U.S. Cl. 123—276 **17 Claims**



1. A direct fuel injection type spark ignition internal combustion engine comprising:

a piston/cylinder structure including a cylinder, a piston reciprocally movable in the cylinder, and a cylinder head located above the cylinder; the piston including a shallow dish portion and a deep dish portion formed in a top portion of the piston; an inside surface of the cylinder, an upper surface of the piston including surfaces of the shallow and deep dish portions and a lower surface of the cylinder head defining a combustion chamber therein; the piston/cylinder structure further including two intake ports and at least one exhaust port formed in the cylinder head and communicating with the combustion chamber;

a spark plug located close to an axis of the combustion chamber and coupled to the cylinder head so as to protrude into the combustion chamber from the lower surface of the cylinder head;

a fuel injection nozzle located at a radially outer portion of the combustion chamber, a fuel injection direction and fuel injection timing of the fuel injection nozzle being predetermined for high and low engine load operation, the fuel injection nozzle having at least one fuel injection hole for injecting a fuel to be injected toward the shallow dish portion at an early stage of an injection period of a fuel injection timing in the high engine load operation, toward the deep dish portion at a late stage of the injection period of the fuel injection timing in the high engine load operation and during an entire stage of an injection period of a fuel injection timing in the low engine load operation, and wherein an axis of the shallow dish portion and an axis of the deep dish portion are offset from an axis of the piston on the side close to the fuel injection nozzle, the axis of the deep dish portion being offset further from the axis of the piston than the axis of the shallow dish portion.

4,958,605

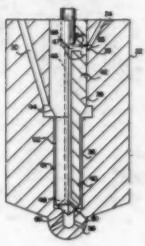
FUEL INJECTION NOZZLE

Glenn B. O'Neal; Quentin A. Baker; Henry E. Mecredy, III, all of San Antonio, Tex., and Daniele Terna, Milan, Italy, assignors to Euron S.p.A., Milan, Italy

Filed Apr. 10, 1989, Ser. No. 335,282

Int. Cl.[5] F02B 3/10; F02M 45/08, 61/06

U.S. Cl. 123—300 **17 Claims**



1. A fuel injection nozzle for an engine having at least one compression-ignition combustion chamber comprising:

(a) a first intake means for receiving a charge of a first fuel and a second intake means for receiving a charge of a second fuel;

(b) a cavity having respective openings for receiving said first and second charged fuels from the respective intake means;

(c) valve means movable within the cavity and adapted to sealingly engage a wall of the cavity to form at least one collection zone for collecting said fuels received from said openings and to disengage from the wall of the cavity to thereby release said fuels, said valve means comprising means for conveying one of said fuels from one of said openings to said collection zone; and

(d) injection means adapted to receive the fuels from the at least one collection zone and to release said fuels into said combustion chamber.

4,958,606

SUPERCHARGED ENGINE

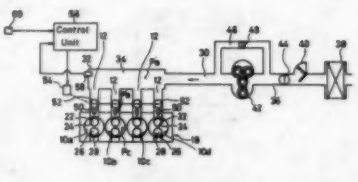
Mitsuo Hitomi; Junso Sasaki; Akira Takai, all of Hiroshima; Kazuaki Umezono, and Fumio Hinatsue, both of Aki, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Nov. 27, 1987, Ser. No. 125,982

Claims priority, application Japan, Nov. 27, 1986, 61-282624; Nov. 27, 1986, 61-282625; Feb. 9, 1987, 62-27947

Int. Cl.[5] F01L 1/34; F02D 39/08

U.S. Cl. 123—316 **40 Claims**



1. A supercharged engine comprising:

a cylinder;

a piston slidably received in said cylinder and reciprocatingly movable therein, said piston and said cylinder defining a combustion chamber therebetween,

the engine having a geometric compression ratio of at least 8.5;

a crank rotatably mounted in the engine and operatively connected to said piston, said crank limiting reciprocal movement of said piston within said cylinder between a top dead center position and a bottom dead center position, and said crank rotating as said piston reciprocates in said cylinder;

an engine output means operatively connected to said crank for generating an engine output from the rotation of said crank;

an intake port means open to said combustion chamber, and through which charges of intake air pass to said combustion chamber;

an intake passage open to said intake port means;

a mechanical supercharger operatively disposed in said intake passage and connected to said engine output means so as to be driven by the engine output for pressurizing the charges of intake air supplied to said combustion chamber through said intake port means;

an intake valve operatively disposed in said intake port means for opening and closing to open and close said intake port means;

an exhaust port means open to said combustion chamber and through which exhaust gases generated in said chamber are discharged therefrom;

an exhaust valve operatively disposed in said exhaust port means for opening and closing to open and close said exhaust port means;

the opening and closing of said valves being based on a valve lift of 1 mm, and the engine having a valve timing which can be operatively established to satisfy the equation

$$Y \geq -1.75X + 10$$

wherein Y is the timing of the closing of said intake port means as represented by the crank angle taken between when the piston is at the bottom dead center position and when the intake valve is closed, and X is an overlap angle representing a time period during which both said intake valve and said exhaust valve are open and equal to the crank angle take between when the intake valve is open and when the exhaust valve is closed.

4,958,607

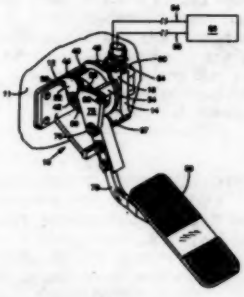
FOOT PEDAL ARRANGEMENT FOR ELECTRONIC THROTTLE CONTROL OF TRUCK ENGINES

Chester E. Lundberg, Sherwood, Oreg., assignor to Williams Controls, Inc., Portland, Oreg.

Filed Apr. 18, 1989, Ser. No. 340,234

Int. Cl.[5] F02D *11/10*; G05G *1/14*

U.S. Cl. 123—399 **8 Claims**



1. A foot pedal arrangement for controlling the throttle of an internal combustion engine in a vehicle comprising; a configured integral support structure having a base adapted for mounting onto the upright wall of a vehicle cab, a foot pedal pivotally mounted on the support structure, a throttle controlling computer, and monitoring means connected to the computer, said monitoring means mounted to the support structure, linear coupling means coupling the monitoring means and foot pedal whereby pivotal movement of the foot pedal is linearly monitored by the monitoring means for proportionate input to the computer for controlling engine throttle, said foot pedal, monitoring means and coupling means being mounted on the support structure for unitized mounting thereof onto the upright wall of a vehicle cab.

4,958,608

IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINE

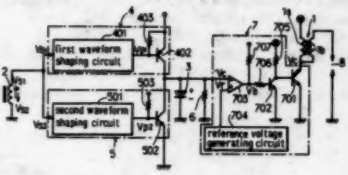
Akihiko Saito, Numazu, and Hideki Yukawa, Susono, both of Japan, assignors to Kokusan Denki Company, Ltd., Numazu, Japan

Filed Apr. 14, 1989, Ser. No. 338,058

Claims priority, application Japan, Apr. 27, 1988, 63-57077[U]

Int. Cl.[5] F02P *5/155*

U.S. Cl. 123—427 **8 Claims**



1. An ignition system for an internal combustion engine comprising:

at least one ignition coil;

a signal coil for generating a first signal at a position of which a phase is advanced relative to an ignition position of the internal combustion engine and a second signal at said ignition position;

a control capacitor;

a charging circuit for charging said control capacitor when said first signal is generated;

a discharge circuit for causing discharge of said control capacitor when said second signal is generated;

a discharge resistor connected in parallel with said control capacitor;

a switch circuit for controlling a primary current which is turned on to cause a primary current to flow from a power supply to said ignition coil when a voltage across said control capacitor rises and turned off to interrupt said primary current when said voltage falls.

4,958,609

FUEL INJECTION TIMING CONTROL FOR A CRANKCASE SCAVENGED TWO-STROKE ENGINE

Douglas E. Trombley, Warren; Kenneth J. Buslepp, Utica; Cathy C. Lillie, and Marcel R. Wanckel, both of Mt. Clemens, all of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 18, 1989, Ser. No. 451,834

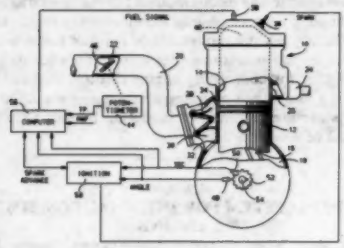
Int. Cl.[5] F02D *41/04*; F02M *51/00*

U.S. Cl. 123—478 **14 Claims**

1. In a crankcase scavenged two-stroke engine having timed direct cylinder fuel injection and a movable throttle valve for regulating engine intake air, a method for improving the response of engine output torque to a change in throttle position comprising:

measuring throttle position;

deriving an indication of the time rate of change in throttle position; and



adjusting fuel injection timing as a function of measured throttle position and time rate of change in throttle position.

4,958,610

FUEL INJECTION SYSTEM

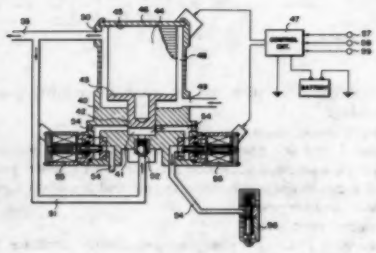
Tadahiro Yamamoto, and Ken Ota, both of Yokosuka, Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Jan. 10, 1989, Ser. No. 295,620

Claims priority, application Japan, Jan. 11, 1988, 63-3320

Int. Cl.[5] F02M *51/04, 41/02, 57/02*

U.S. Cl. 123—478 **9 Claims**



1. A fuel injection system including a plurality of fuel injection valves and a fuel tank, the fuel injection system comprising:

a pump body formed with a cylinder and including a cylindrical wall and an end wall which cooperate with each other to define said cylinder;

a plunger slidably disposed in said cylinder;

an actuator mounted within said pump body, said actuator comprising a piezoelectric element of a laminated type and so constructed and arranged as to reciprocate said plunger in said cylinder as said actuator extends and contracts;

means for providing a fuel return passage having one end communicating with said pump body and an opposite end communicating with the fuel tank;

means for providing a fuel supply passage having one end connected to said fuel return passage and an opposite end communicating with said cylinder;

means for preventing fuel from flowing out of said cylinder toward said fuel return passage through said fuel supply passage;

said pump body being formed with a plurality of fuel delivery passages having one end thereof communicating with said cylinder;

a plurality, corresponding in number to said plurality of fuel delivery passages, of solenoid valves mounted to said pump body to close said plurality of fuel delivery passages, respectively; and

means for controlling said actuator and said plurality of solenoid valves.

4,958,611

AIR-FUEL RATIO CONTROLLER OF INTERNAL COMBUSTION ENGINE

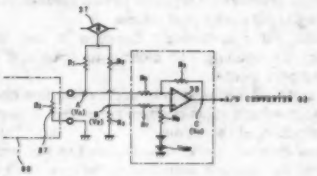
Masanobu Uchinami; Toshihisa Takahashi, both of Himeji; Hitoshi Inoue, Amagasaki; Takahiro Moronaga, and Shinichi Nishida, both of Himeji, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 1, 1989, Ser. No. 317,486

Claims priority, application Japan, Mar. 1, 1988, 63-49085

Int. Cl.[5] F02D *41/22*

U.S. Cl. 123—479 **1 Claim**



1. An air fuel (A/F) ratio controller of an internal combustion engine comprising:

a wide-range A/F ratio sensor which is composed of the following: an oxygen sensor for generating a specific voltage responsive to the difference of oxygen concentration between atmosphere and exhaust gas inside of said internal combustion engine, an oxygen pump for letting pump current flow so that said voltage is a predetermined value, and a heater for heating said oxygen sensor and oxygen pump;

an A/F ratio detection device for detecting A/F ratio of fuel-mixed vapor supplied to said engine in accordance with said pump current;

a controller for executing feedback control of a quantity of fuel to be supplied to said engine so that the detected A/F ratio is an objective value;

abnormal-condition detection means for detecting occurrence of an abnormal condition in said heater on the basis of the resistance value of said heater; and

feedback-stop means for stopping said feedback control to said engine when said abnormal condition is detected in said heater, wherein said abnormal-condition detection means of said heater is substantially composed of a Wheatstone bridge circuit which includes said heater, and wherein said means detects whether or not equilibrium of signals outputted from said bridge circuit deviates by more than a predetermined value, and if an unbalance by more than said predetermined value is detected, said means stops execution of feedback control of fuel quantity to be supplied to said engine.

4,958,612

AIR-FUEL RATIO CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

Akira Kato, and Toru Yano, both of Wako, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed Jun. 19, 1989, Ser. No. 368,377

Claims priority, application Japan, Jun. 30, 1988, 63-162858

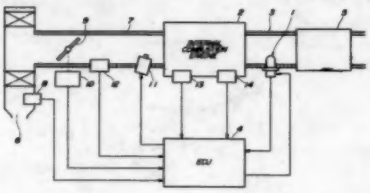
Int. Cl.[5] F02D *41/14*

U.S. Cl. 123—489 **11 Claims**

1. In an air-fuel ratio control method for an internal combustion engine having an exhaust gas-ingredient concentration sensor provided in an exhaust system thereof and generating an

output proportional to the concentration of an ingredient contained in exhaust gases emitted from said engine, wherein the air-fuel ratio of a mixture supplied to said engine is controlled to a desired air-fuel ratio corresponding to an operating condition in which said engine is operating, in a feedback manner responsive to the output of said sensor, and supply of fuel to said engine is interrupted while said engine is in a predetermined decelerating condition,

the improvement comprising the steps of;



progressively decreasing said desired air-fuel ratio from a value larger than a value corresponding to the operating condition of said engine to the latter value after said engine leaves said predetermined decelerating condition, and

controlling the air-fuel ratio of said mixture supplied to said engine to the progressively decreased air-fuel ratio in said feedback manner.

4,958,613

INTERNAL COMBUSTION ENGINE WITH CRANKCASE VENTILATION SYSTEM

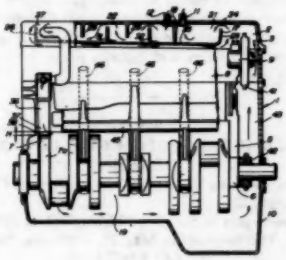
Toyoki Hiraoka, Tokyo; Yuichi Murakami, and Nobuyuki Okitsu, both of Yokohama, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama City, Japan

Filed Oct. 4, 1989, Ser. No. 417,622

Claims priority, application Japan, Oct. 18, 1988, 63-135580[U]

Int. Cl.[5] F02M *25/00*

U.S. Cl. 123—572 **10 Claims**



1. An internal combustion engine comprising:

a rocker cover secured to a cylinder head and defining therein a chamber;

means defining a first passage through which fresh air is introduced into the rocker cover chamber;

a crankcase defining thereinside a chamber;

means defining a second passage through which said rocker cover chamber is in communication with an air intake passage;

a crankshaft rotatably supported and including a counterweight, said counterweight being disposed within said crankcase chamber and having a peripheral surface; and

means defining a fresh air suction port through which said rocker cover chamber is in communication with said crankcase chamber, said fresh air suction port having a first end which opens to said crankcase chamber and is located in the vicinity of the peripheral surface of said counterweight.

4,958,614

FEED DEVICE FOR AN INTERNAL COMBUSTION ENGINE

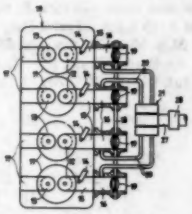
Sergio Truzzi, Cislano; Emilio Oldani, Cerro Maggiore, and Ugo Malter, Milan, all of Italy, assignors to Alfa Lancia S.p.A., Arese, Italy

Filed Feb. 14, 1990, Ser. No. 480,012

Claims priority, application Italy, Feb. 17, 1989, 19478 A/89

Int. Cl.[5] F02D *9/00*

U.S. Cl. 123—585 **7 Claims**



1. A feed device for an internal combustion engine, comprising first feed ducts (15, 16) for the cylinders (11), at least two throttle valves (19) for said first ducts, and second ducts (20) connected to a common manifold (27) communicating with the external environment and with said first ducts (15, 16) so as to short-circuit said at least two throttle valves (19), said manifold (27) being provided with valve means (28) for regulating the feed flow to the engine when said throttle valves (19) are in their maximum closure position, characterized in that feed ports (25) for said second ducts (20) are also provided, said feed ports (25) being engaged with non-return valve means (23) which allow the feed fluid to flow from said common manifold (27) to said first feed ducts (15, 16) for the cylinders (11) but which intercept back flow from said first ducts (15, 16) to said common manifold (27).

4,958,615

SIGNAL GENERATOR FOR AN INTERNAL COMBUSTION ENGINE

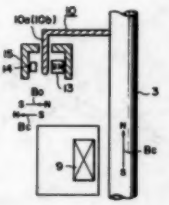
Yutaka Ohashi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 12, 1989, Ser. No. 420,402

Claims priority, application Japan, Oct. 12, 1988, 63-254761

Int. Cl.[5] F02P *7/07*

U.S. Cl. 123—617 **5 Claims**



1. A signal generator comprising:

a Hall element;

a magnet which is separated from the Hall element by a gap

and which generates a magnetic field which acts on the Hall element;

a distributor shaft;

a magnetic vane which is secured to the distributor shaft and passes through the gap between the Hall element and the magnet when the distributor shaft is rotated; and

an ignition coil which generates a magnetic field when current passes through the ignition coil, wherein the magnetic field which is generated by the ignition coil combines subtractively with the magnetic field generated by the magnet in the vicinity of the Hall element.

4,958,616

MULTIPLE-SPARK IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES, PARTICULARLY FOR MOTOR VEHICLES

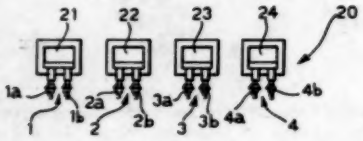
Vittorio Di Nunzio, and Eraldo Giaccardi, both of Turin, Italy, assignors to Fiat Auto S.p.A., Turin, Italy

Filed May 30, 1989, Ser. No. 358,054

Claims priority, application Italy, Jun. 6, 1988, 67520 A/88

Int. Cl.[5] F02P *15/02, 3/04*

U.S. Cl. 123—635 **1 Claim**



1. An ignition system for an internal combustion engine having at least one cylinder,

a pair of ignition plugs associated with each cylinder and a single compact energizing means associated with each pair of ignition plugs and mounted directly on each pair of ignition plugs respectively in direct electrical contact therewith to provide transmission of ignition energy directly from each energizing means to each pair of ignition plugs respectively, substantially without any transmission loss;

wherein each energizing means comprises electrical transformer means having a secondary winding connected to each pair of ignition plugs respectively.

4,958,617

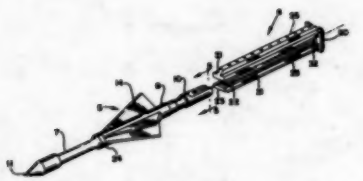
ARCHERY ARROW AND SABOT

Jeffrey R. Anderson, 162 Slocum Lake Rd., Wauconda, Ill. 60084

Continuation-in-part of Ser. No. 80,019, Jul. 31, 1987, Pat. No. 4,829,974. This application Mar. 23, 1989, Ser. No. 327,769

Int. Cl.[5] F41B *5/00;* **A63B** *65/02*

U.S. Cl. 124—24.1 **11 Claims**



1. An archery arrow comprising a shaft having a point at one end and a nock on the opposite end and fletching consisting of blades located rearwardly of the center of gravity of the arrow, the trailing edges of two opposing blades being bent so as to induce axial spin in flight, and said arrow having a length not exceeding about 7 inches.

4,958,618

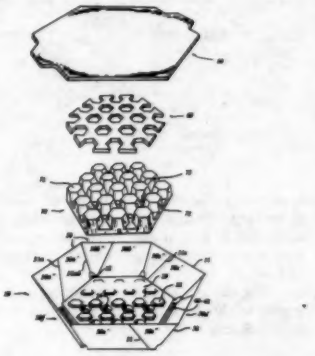
FOLDING DISPOSABLE COOKERY UNIT

Peter Davidson, P.O. Box 3731, Stanford, Calif. 94309

Continuation-in-part of Ser. No. 296,529, Jan. 12, 1989, abandoned. This application Dec. 8, 1989, Ser. No. 447,887

Int. Cl.[5] F24C *1/16*

U.S. Cl. 126—9 B **32 Claims**



1. A foldable firebox body comprising:

a bottom panel for supporting a fuel in the region above the top surface thereof, and

a plurality of side panels sequentially hingedly connected together around said bottom panel and each side panel hingedly connected to said bottom panel,

each of said side panels having at least two panel portions and having a hinge means for folding said panel portions in overlapping relationship

whereby said side panel portions can be folded to a body closed position with said side panel portions overlapping and substantially enclosing said region above said bottom panel and said side panel portions can be folded to a body open position with said side panels projecting outwardly and upwardly from said bottom panel for supporting a cooking surface.

4,958,619

PORTABLE, FLUELESS, LOW NOX, LOW CO SPACE HEATER

Alan Kardas, Chicago, Ill., assignor to Institute of Gas Technology, Chicago, Ill.

Continuation-in-part of Ser. No. 222,062, Jul. 8, 1988, Pat. No. 4,846,679. This application May 18, 1989, Ser. No. 353,790

Int. Cl.[5] F24C *3/00*

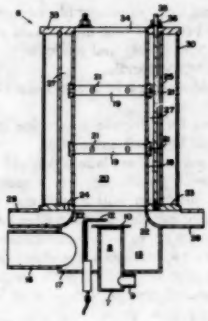
U.S. Cl. 126—85 R **17 Claims**

1. A flueless, portable space heater comprising: a fuel chamber having a fuel inlet and fuel distributing means, fuel swirling means for generating a swirling fuel flow;

a primary air chamber, primary air swirling means for generating a counter-swirling primary air flow with respect to said swirling fuel flow, said primary air swirling means having a cross-sectional area permitting only laminar flow of said counter-swirling primary air flow, said fuel distributing means discharging said swirling fuel flow into said counter-swirling primary air flow forming a fuel/air mixture, ignition means for igniting said fuel/air mixture;

at least one combustion chamber wall forming a combustion chamber sealably secured to and in communication with said primary air swirling means, secondary air inlet means,

said combustion chamber in communication with said secondary air inlet means, said secondary air inlet means comprising said at least one combustion chamber wall having a plurality of secondary air supply holes, an intermediate shell surrounding said at least one combustion chamber wall, said intermediate shell forming a space between said intermediate shell and said at least one combustion chamber wall, a top and a bottom sealing said space, a secondary air inlet in communication with said



space, said bottom having at least one bottom plate through hole, at least one secondary air inlet tube sealably secured to said bottom and in communication with said at least one bottom plate through hole, each said bottom plate through hole in communication with said space between said intermediate shell and said at least one combustion chamber wall; and

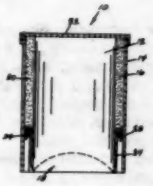
an outer protective shell surrounding and supportably spaced from said at least one combustion chamber wall of said combustion chamber.

4,958,620

WATER HEATER CONSTRUCTION

Thomas E. Nelson, Anchorage, Ky., assignor to Sotech, Inc., Shelbyville, Ky.

Division of Ser. No. 8,564, Jan. 29, 1987, Pat. No. 4,736,509.
This application Mar. 1, 1988, Ser. No. 162,504
Int. Cl.[5] E01C *19/45;* F24N *1/00*
U.S. Cl. 126—344 10 Claims



1. A water heater device comprising:

a water tank;

an outer shell concentrically located over the water tank defining an annular space therebetween;

an annular sleeve of insulation material located in the annular space extending from approximately the bottom end of the water heater device upwardly longitudinally thereof a predetermined distance less than the entire height of the water heater device; and,

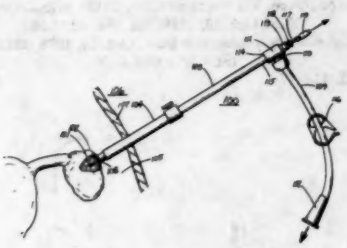
an annular cuff of insulation material located proximate the top end of the annular sleeve and folded back over the convex outer surface of the sleeve, the annular cuff having a radial thickness greater than the radial thickness of the sleeve.

4,958,621

ENDOSCOPIC ASPIRATION INSTRUMENT

Howard C. Topel, Deerfield, Ill., and Thomas L. Foster, Poland, Ind., assignors to Vance Products Incorporated, Spencer, Ind.

Filed Apr. 4, 1990, Ser. No. 505,082
Int. Cl.[5] A61B *1/00*
U.S. Cl. 128—4 20 Claims



1. An endoscopic instrument comprising:

a first elongated member having a first distal end, a first proximal end, and a first longitudinal passageway extending between said first ends, said first proximal end having first and second access ports, said first access port having access to said first passageway; and

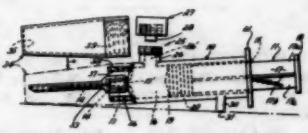
a positioning device positioned within said first passageway a predetermined distance from said first distal end and having a positioning passageway capable of receiving an aspiration needle inserted through said second access port.

4,958,622

HYPODERMIC SYRINGE FOR TAKING AND TRANSPORTING A SPECIMEN

William M. Selenke, 18 Gambier Cir., Cincinnati, Ohio 45218

Filed May 11, 1983, Ser. No. 493,435
Int. Cl.[5] A61B *5/14*
U.S. Cl. 128—765 31 Claims



1. A hypodermic syringe for obtaining and transporting a fluid specimen comprising

a barrel having a narrowed opening at a forward end and a plunger opening at a rearward end and an interior chamber defined within said barrel,

a plunger sized to pass through the plunger opening into the interior chamber of said barrel,

means for accessing the interior chamber of said barrel located at a point proximate the narrowed opening, said accessing means comprising an extension which defines a hollow shaft communicating with the interior chamber, the extension being canted at an angle relative to and extending from said barrel,

a substantially fluid-tight closure means for said accessing means, and

means for supporting the syringe in a skewered position with respect to horizontal located at a point proximate the

rearward end of said barrel, such that when the syringe is placed on a horizontal surface with said supporting means in contact with the horizontal surface the syringe is inclined with the rearward end elevated relative to the forward end with the extension of said accessing means being substantially perpendicular to the horizontal surface.

4,958,623

PROTECTIVE DEVICE FOR ENDOSCOPISTS, IN PARTICULAR FOR URETHRAL USE

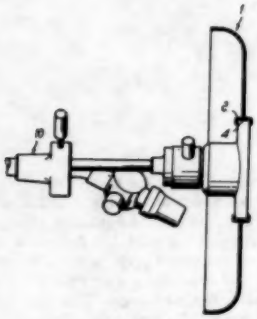
Francesco Rocco, Via Fogazzaro, 20, 20135 Milan, Italy

Filed Oct. 10, 1989, Ser. No. 419,034

Claims priority, application Italy, Oct. 24, 1988, 22054/88[U]

Int. Cl.[5] A61B *1/00*

U.S. Cl. 128—7 **2 Claims**



1. A protective device for endoscopists, specifically designed for urethral use, comprising a disc-shaped plate-like screen to be applied about an eye-piece of an optical detecting device to be inserted into a catheter to display a patient operating field, wherein said screen is provided with a curved peripheral edge defining a peripheral concave portion of said screen and with a central resiliently yieldable ring member having a substantially reversed-U cross-section, said ring member being adapted to be engaged with a peripheral portion of said eye-piece so as to prevent said screen from axially moving.

4,958,624

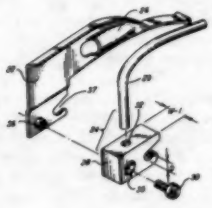
INTERCHANGEABLE LARYNGEAL BLADE

R. Douglas Stone, Camillus, and Thomas W. Turner, Marcellus, both of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.

Filed Mar. 31, 1989, Ser. No. 331,164

Int. Cl.[5] A61B *1/06*

U.S. Cl. 128—11 **10 Claims**



6. In a set of non-interchangeable fiber optic and incandescent type light laryngoscopes that have a handle and removable blade-light assembly with mutually exclusive interlocking mounting mechanisms the combination of:

a fiber optic type handle adapted to operatively receive a fiber optic light type blade-light assembly,

an incandescent light type handle adapted to operatively receive an incandescent light type blade-light assembly,

a fiber optic light sub-assembly comprising a light tube and a first integral base means, said first base means adapted to operatively and exclusively engage a fiber optic type handle,

an incandescent light sub-assembly comprising a light tube and a second integral base means, said second base means adapted to operatively and exclusively engage an incandescent light type handle,

a metallic blade having a light sub-assembly engaging member, and

fastening means for selectively securing said metallic blade to one of said light sub-assemblies,

so that when said metallic blade is secured to said fiber optic light sub-assembly a fiber optic type removable blade-light assembly is provided which will operatively mount on said fiber optic handle to form a fiber optic laryngoscope and when secured to said incandescent type light sub-assembly an incandescent type removable blade-light assembly is provided which will operatively mount on said incandescent type light handle to form an incandescent light laryngoscope.

4,958,625

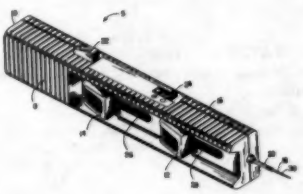
BIOPSY NEEDLE INSTRUMENT

James S. Bates; Thomas P. Clement, both of Bloomington, and Darrell W. White, Spencer, all of Ind., assignors to Boston Scientific Corporation, Watertown, Mass.

Filed Jul. 18, 1989, Ser. No. 381,780

Int. Cl.[5] A61B *10/00*

U.S. Cl. 128—754 **15 Claims**



1. A biopsy needle instrument comprising:

a housing defining a first cavity and a second cavity,

extending from said housing, an axially elongated stylet having a distal end and a proximal end and defining a side-facing notch adjacent said distal end and a cannula coaxially disposed about said stylet, said cannula having a distal end and a proximal end,

said stylet mounted for axial movement relative to said housing and relative to said cannula between a first, retracted position and a second, extended position,

said cannula mounted for axial movement relative to said housing and relative to said stylet between a first, retracted position and a second, extended position,

stylet retaining means at the proximal end of said stylet and disposed in said first cavity,

cannula retaining means at the proximal end of said cannula and disposed in said second cavity,

means for biasing said stylet distally toward said second, extended position,

means for biasing said cannula distally toward said second, extended position,

stylet latch means for retaining said stylet in said first, retracted position,

cannula latch means for retaining said cannula in said first retracted position,

means for retracting said stylet from said second, extended position to said first, retracted position for engagement of said stylet latch means to retain said stylet in retracted position against the means for biasing the stylet distally,

separate and discrete means for retracting said cannula from said second, extended position to said first, retracted position for engagement of said cannula latch means to retain said cannula in retracted position against the means for biasing the cannula distally, and

means for releasing said stylet latch means to allow said stylet to move from said first, retracted position to said second, extended position and thereafter releasing said cannula latch means to allow said cannula to move from said first, retracted position to said second, extended position.

4,958,626

METHOD FOR APPLYING ELECTROMAGNETIC WAVE AND ULTRASONIC WAVE THERAPIES

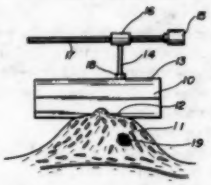
Masao Nambu, Yokohama; Tsutomu Watari, Tokyo; Tomoyuki Sakamoto, Kokubunjimachi, and Kazuo Akojima, Yachiyo, all of Japan, assignors to Nippon Oil Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 39,504, Apr. 17, 1987, abandoned. This application Feb. 29, 1988, Ser. No. 165,417

Claims priority, application Japan, Apr. 22, 1986, 61-91228

Int. Cl.[5] A61B *17/00*; A61N *5/00*

U.S. Cl. 128—24 A **12 Claims**



1. A method for applying electromagnetic wave therapy comprising applying to a surface of a human body a material simulating a living tissue made of a frozen and thawed polyvinyl alcohol hydrogel of high water content having soft reversible elasticity and shape-retaining properties, pressing said material onto the surface of the human body so that said material is intimately contacted with said surface of the human body with substantially no spaces present therebetween, generating as electromagnetic wave and irradiating said wave to the human body through said material.

4,958,627

THERAPEUTIC BED

Ki D. Park, 920 H Street NE., Washington, D.C. 20002

Filed Jun. 30, 1988, Ser. No. 213,890

Int. Cl.[5] A61H *1/00*

U.S. Cl. 128—33 **4 Claims**

1. A therapeutic bed for the human body comprising:

bed frames,

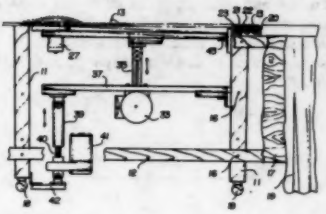
connecting members attached to the top of said bed frames,

a pair of brackets attached to said connecting members, said brackets comprising a plurality of separate partitions which alternatively extend from an edge of said brackets for defining spaces therebetween and a plurality of slots which are disposed at ends of said alternate separate partitions,

a flexible wire passing through said spaces and said slots of said brackets on alternate opposite sides of the bed frames of the therapeutic bed in a serpentine configuration,

a vibrating motor attached to said flexible wires for vibrating, and

a motor having a cam and mounted to a longitudinal motor support which includes hinges at one end and a motor support adjusting member at the other end thereof, said cam being provided with a cam arm connected to said



cam and an intermittent hitting plate for hitting a bed floor formed by said flexible wires, whereby the flexible wires of the therapeutic bed treat and massage desired regions of the human body disposed thereon, said motor support adjusting member including a two-way motor, an adjusting screw stand connected to said two-way motor, and a tubular support for receiving said adjusting screw stand.

4,958,628

HAND-HELD VIBRATORY MASSAGER

Hironori Iwamoto, and Shigeyuki Ikeda, both of Hikone, Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

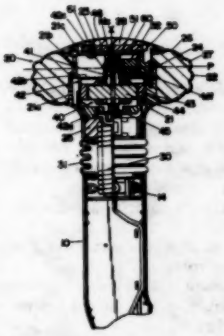
Continuation of Ser. No. 82,174, Aug. 6, 1987, Pat. No. 4,825,853. This application Apr. 27, 1989, Ser. No. 343,634

Claims priority, application Japan, Aug. 20, 1986, 61-194719

The portion of the term of this patent subsequent to May 2, 2006, has been disclaimed.

Int. Cl.[5] A61H *1/00*

U.S. Cl. 128—36 **6 Claims**



1. A hand-held vibratory massager comprising

an elongated hand grip;

an applicator head including a core barrel having a base and a top portion;

a resilient coupling connecting said base to an end of said hand grip and permitting limited movement of said applicator head in substantially all directions relative to said hand grip;

a drive motor mounted internally of said base, said drive motor having an output shaft extending into said top portion of said applicator head;

an eccentric flyweight mounted internally of said top por-

tion on the output shaft of said motor in eccentric relation thereto for providing a vibratory motion to said applicator head upon rotation of said output shaft; and

a counterweight fixed to said top portion of said applicator head on the opposite side of said flyweight from said motor;

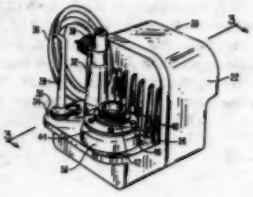
whereby said counterweight counterbalances the weight of said motor and other components of said applicator head located on the side of said flyweight opposite from said counterweight and reduces countershaking of the hand grip as a reaction to said vibratory motion of said applicator head.

4,958,629

WATER-POWERED ORAL HYGIENE DEVICE

Steven L. Peace, and John E. Petrovic, both of Fort Collins, Colo., assignors to Teledyne Industries, Inc., Fort Collins, Colo.

Filed Jun. 21, 1988, Ser. No. 209,302
Int. Cl.[5] A61H 9/00
U.S. Cl. 128—66 **12 Claims**



1. An oral hygiene device comprising:

a housing;

an inlet in said housing for receiving water from a source at a pressure subject to variation;

a regulator, within said housing, coupled to said inlet and responsive to said water from said inlet to accommodate said variation and develop automatically a stream of said water at a constant pressure;

a turbine having a rotor mounted within said housing for rotation;

a plurality of impellers successively spaced peripherally around said rotor;

a nozzle mounted in said housing and coupled to said regulator for directing said stream against said impellers to rotate said rotor;

a pump disposed within said housing and having a piston mounted for reciprocation within a cylinder;

means responsive to rotation of said rotor for driving said piston in reciprocation;

a head disposed over one end of said cylinder;

means responsive to water from said stream deflected by said impellers for enabling movement of said piston away from said head to draw water into said cylinder;

means for enabling said water in said cylinder to exit from said cylinder, upon movement of said piston toward said head, as a series of pulses;

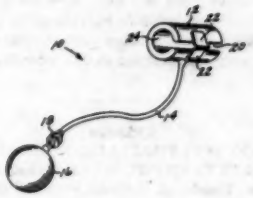
and means coupled to said head for delivering said pulses from said housing.

4,958,630

METHOD AND APPARATUS FOR TREATING IMPOTENCE

Robert F. Rosenbluth, Laguna Niguel, and Brian J. Cox, Lake Forest, both of Calif., assignors to Advanced Surgical Intervention, Inc.

Filed Oct. 6, 1989, Ser. No. 418,286
Int. Cl.[5] A61F 2/26
U.S. Cl. 128—79 **29 Claims**



5. A device for treating impotence in a human patient, comprising:

an inflatable cuff, implantable in the patient so as to receive and engage a penile vein or a crus of a corpus cavernosum of the patient; and

cuff actuation means, implantable in the patient, and operable by the patient, for selectively inflating and deflating the cuff, thereby selectively and reversibly restricting the blood flow through the vein or crus, the cuff actuation means comprising:

a fluid-filled squeeze bulb;

conduit means for providing fluid communication between the bulb and the cuff; and

valving means for allowing the flow of fluid through the conduit means from the bulb to the cuff in response to the collapsing of the bulb due to the application of external pressure thereto, the valving means including a housing defining a fluid flow path between the bulb and the conduit means, and a valve element in the housing, movable between a first position in which the valve element is closed against a valve seat, thereby closing the fluid flow path, and a second position opening the fluid flow path, the valve element being movable from the first position to the second position in response to the pressure-induced collapsing of the bulb;

biasing means in the housing and engageable against the valve element, for biasing the valve element against the valve seat; and

manual valve actuation means, operably associated with the valving means, for selectively moving the valve element from the first position to the second position in response to manual operation, thereby to allow the flow of fluid through the conduit means from the cuff to the bulb, the manual valve actuation means comprising:

means defining a flexible portion of the housing;

a push-button seated in the housing so as to be manually operable, the push-button including a protuberance that is engageable against the flexible portion; and

valve element engagement means disposed on the flexible portion so as to be operably engageable against the valve element to displace the valve element from the valve seat in response to the flexing of the flexible portion when the push-button is operated to engage the protuberance against the flexible portion.

4,958,631

SELF ADJUSTING, SOFT NECK SUPPORT COLLAR

Jeff Sarkozi, 1117 N. Avila Pl., Orange, Calif. 92669

Filed Oct. 2, 1989, Ser. No. 415,872
Int. Cl.[5] A61F 5/00
U.S. Cl. 128—87 B 6 Claims

1. A self adjusting, soft, neck support collar, comprising:

(a) an upper, tubular-shaped element providing an outer, woven cloth covering material and an interior which contains a soft fill material, the tubular-shaped element defining tapered ends which are adapted for closure under a user's chin by closure elements mounted at each end, to thereby form a ring which fits upwardly around a user's neck; and,

(b) a lower, tubular-shaped element providing an outer, woven cloth covering material, and shaped to form an interior which contains a soft fill material, the lower tubular-shaped element being adapted for closure at each end by closure elements to form a ring which fits around the lower portion of the user's neck, the upper tubular element resting on and being joined to the lower tubular element along a portion of their lengths so that the closure portions of each tubular element are offset from each other, the closure portion of the lower tubular element being positioned rearwardly on the neck of the user; whereby,

i. the tapered closure portion of the upper element and adjacent lower, tubular element define a chin support for the user; and,

ii. the soft fill materials of the upper and lower tubular elements interiors function to: 1. impart a flexible support for the user's neck and chin which self adjusts for different shapes, sizes and weights of the user's neck and chin regions; 2. maintain a resilient support which increases as the user's neck and chin deviate from an erect position, during motion; and, 3. self adjust to the user in a rest position.

4,958,632

ADAPTABLE, DIGITAL COMPUTER CONTROLLED CARDIAC PACEMAKER

Stephen R. Duggan, Rosemount, Minn., assignor to Medtronic, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 926,303, Jul. 20, 1978, abandoned. This application Mar. 5, 1980, Ser. No. 127,308
Int. Cl.[5] A61N 1/36
U.S. Cl. 128—419 PG 54 Claims

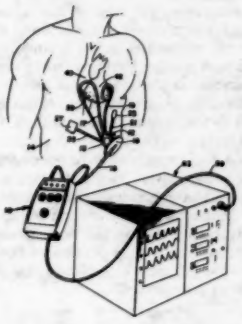
1. Body implantable electrical apparatus coupled via a plurality of leads to body tissue, said apparatus comprising:

(a) means for applying electrical pulses via the leads to the body tissue;

(b) memory means including at least first and second storage portions, each storage portion storing a distinct set of instructions;

(c) control means for selectively executing one of the sets of instructions stored in said memory means, and comprising addressing means for accessing one of said first and second storage portions and a microprocessor for selectively applying addresses from said addressing means to said memory to control the execution of a selected program, said control means coupled to said appying means to effect control of the electrical pulses;

(d) means for selectively changing the address of said addressing means, whereby a different set of instructions is addressed by said addressing means and the instructions of the addressed set executed in order by said control means, whereby the character of the electrical pulses applied to the body tissue is changed accordingly; and



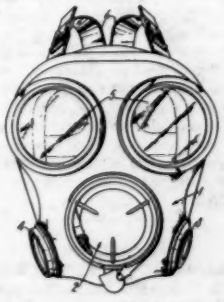
(e) resetting means coupled to said microprocessor for periodically generating a reset signal to reset said address means to a predetermined return address, whereby if said address means inadvertently addresses a meaningless location in said memory means, the execution by said microprocessor of a selected program within said memory will be continued by addressing the predetermined return address within the selected program.

4,958,633

VALVE FOR RESPIRATOR

Cyril N. E. Angell, Trowbridge, United Kingdom, assignor to Avon Industrial Polymers Limited, Melksham, England

Continuation of Ser. No. 795,916, Nov. 7, 1985, abandoned. This application May 9, 1989, Ser. No. 349,923
Claims priority, application United Kingdom, Nov. 13, 1984, 8428640
Int. Cl.[5] A62B 7/00
U.S. Cl. 128—201.19 15 Claims



1. A respirator comprising a facepiece having a gas inlet and a gas outlet, an outlet valve assembly for permitting flow of gas outwardly only at the gas outlet, an inlet valve assembly for permitting flow of gas inwardly only at the gas inlet, at least the outlet valve assembly comprising a valve member and a

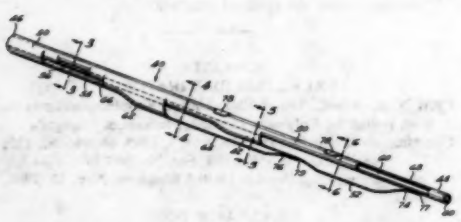
valve seat, said valve member comprising a disc of elastomeric material, the disc having a periphery and a central portion, securing means at the central portion of the disc for securing that portion stationary in the valve assembly, part of the periphery of the disc being for sealing contact against the seat of the valve assembly to prohibit gas passage in the non-permitted direction, an annular channel in the disc between the central portion and the periphery thereof, said disc being continuously conical between said channel and said periphery whereby the part on the periphery is positively biassed towards said sealing contact with the seat of the valve assembly but the rate of increase of resistance to gas flow in the permitted direction lessens above a predetermined value of flow, said outlet comprising a speech transmitter with a sound passage therethrough, said sound passage having an inner upstream end and an outer downstream end relative to the permitted direction of flow of gas outwardly from the facepiece, the said outlet valve assembly being in said sound passage with said disc of elastomeric material across the passage, the passage comprising wall means defining a convolute portion of the passage of cross-section increasing progressively in the downstream direction of permitted flow and having at least two substantial reversals of direction, and defining a further portion of the passage which is progressively convergent in the downstream direction of permitted flow, said convolute portion of the passage being downstream of the progressively convergent portion relative to the direction of permitted flow.

4,958,634

LIMACON GEOMETRY BALLOON ANGIOPLASTY CATHETER SYSTEMS AND METHOD OF MAKING SAME

G. David Jang, 204 E. South St., Redlands, Calif. 92373

Filed May 6, 1987, Ser. No. 47,049
Int. Cl.[5] A61M *29/02*
U.S. Cl. 606—194 **25 Claims**



1. An angioplasty catheter, comprising:
a catheter shaft having a proximal end and a distal end;
first and second independently inflatable and independently deflatable angioplasty balloons at the distal end of said catheter, each said balloon having a balloon wall and having a length and a maximum inflated diameter, wherein said balloons and said distal end of said catheter shaft comprise a single, integral, monolithic piece of polymer material and wherein said balloons are eccentrically positioned with respect to each other, wherein said first balloon has a maximum inflated diameter less than that of said second balloon and is at least partially inside said second balloon.

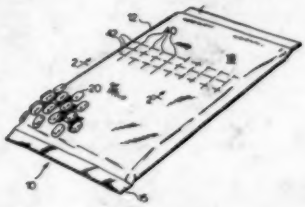
4,958,635

THERAPEUTIC TEMPERATURE PACK

Frank L. Roberts, Willowdale, Canada, assignor to Bio-Support Industries Ltd., Toronto, Canada

Filed Mar. 21, 1989, Ser. No. 326,839
Int. Cl.[5] A61F *7/02*
U.S. Cl. 128—403 **12 Claims**

1. In a temperature pack for therapeutic use comprising a sealed envelope-like bag of flexible sheet plastic material, said bag having an interior, and a thickened aqueous liquid composition contained within said interior of said bag, the improvement wherein said plastic sheet material is embossed to form a large plurality of small blisters on at least medial portions of at least one major surface of said bag, said blisters



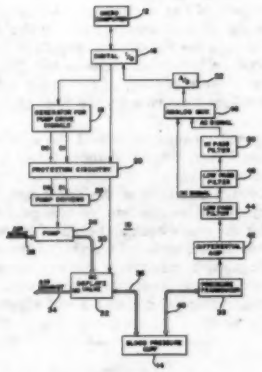
(i) being open to the interior of said bag
(ii) cumulatively having a volume of not greater than about 3% of the total volume of said liquid composition contained within said bag.

4,958,636

VITAL SIGNS MONITOR PUMPING SYSTEM

Thomas Blandino, Madison, and Ruth L. Starr, Evansville, both of Wis., assignors to Criticare Systems, Inc., Waukesha, Wis.

Filed Oct. 5, 1988, Ser. No. 253,712
Int. Cl.[5] A61B *5/00*
U.S. Cl. 128—630 **21 Claims**



1. In a vital signals monitor of the type comprising a measuring chamber and means for measuring a parameter of a fluid contained in the measuring chamber, wherein the parameter varies as a function of fluid pressure and is indicative of a vital sign of a patient, a system for controlling fluid pressure in the chamber comprising:
a variable pumping rate pump connected to the measuring chamber to control pressure in the measuring chamber, said pump comprising a pumping member mounted to oscillate through a stroke and operative to pump fluid into the measuring chamber in response to oscillation of the pumping member, and an electromagnet coupled to the pumping member to drive the pumping member through the stroke in response to a drive signal;
a drive signal generator which generates the drive signal for the pump at a fixed frequency and a variable energy per cycle of the drive signal, wherein the drive signal is applied to the electromagnet and the energy per cycle of the

drive signal affects the length of the stroke and therefore the pumping rate of the pump.

16. In a blood pressure monitor of the type that includes an occluding cuff and means for monitoring pressure variations in the cuff in a measuring frequency range to determine a blood pressure parameter of a patient, a system for supplying a smoothly increasing pressure to the cuff comprising:

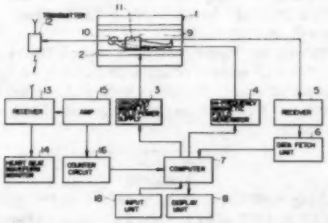
a variable pumping rate pump connected to the cuff to inflate the cuff, said pump comprising a pumping member and means for driving the pumping member through a stroke in response to a drive signal which has at least one variable parameter, wherein the pumping rate of the pump varies as a function of the variable parameter;

control means for periodically generating the drive signal with a selected driving frequency such that the variable parameter is varied over time to cause the pump to gradually increase the pressure in the cuff, said selected driving frequency being outside of and greater than the measuring frequency range to prevent the strokes of the pump from causing pressure variations in the cuff in the measuring frequency range.

4,958,637
MR EXAMINING APPARATUS OF HEART BEAT SYNCHRONOUS TYPE

Toshiaki Aritomi, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 2, 1988, Ser. No. 278,843
Claims priority, application Japan, Dec. 4, 1987, 62-307030
Int. Cl.[5] A61B 5/05
U.S. Cl. 128—653 A **15 Claims**



1. A magnetic resonance examining apparatus of heart beat synchronous type for imaging multiphase images in synchronism with a heart beat of a subject, said apparatus comprising:

means for detecting a heart beat waveform of the subject;

means for generating a synchronizing signal synchronous with the heart beat waveform detected by said detecting means;

means for measuring a repetition period of said heart beat waveform on the basis of the synchronizing signal applied from said synchronizing signal generating means;

input means for inputting a previously stored setting of a repetition time for spin excitation of the subject;

means responsive to said measuring means and said input means for computing a corrected repetition time close to said spin excitation repetition time on the basis of data of said heart beam waveform repetition period supplied from said measuring means and the setting of said spin excitation repetition time supplied from said input means, said corrected repetition time having a value which, when multiplied by a factor of N (N: an integer), becomes equal to that of said heart beat waveform repetition period;

means for setting a plurality of imaging phases so as to form nuclear magnetic resonance images; and

means for effecting spin excitation of the subject according to the corrected repetition period;

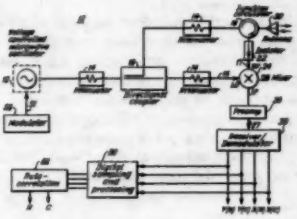
means for setting a plurality of imaging phases so as to form nuclear magnetic resonance images; and

means for effecting spin excitation of the subject according to the corrected repetition time computed by said corrected repetition time computing means and acquiring a nuclear magnetic resonance signal for each of the imaging phases set by said imaging phase setting means.

4,958,638
NON-CONTACT VITAL SIGNS MONITOR

Steven M. Sharpe, Atlanta; Joseph Seals, Stone Mountain; Anita H. MacDonald, Tucker, and Scott R. Crowgey, Avondale Estates, all of Ga., assignors to Georgia Tech Research Corporation, Atlanta, Ga.

Filed Jun. 30, 1988, Ser. No. 213,783
Int. Cl.[5] A61B 5/02, 5/08
U.S. Cl. 128—653 R **21 Claims**



1. An apparatus for measuring simultaneously the heart and respiration rates of a subject comprising:

transmitting means for directing a beam of frequency modulated, continuous wave radio frequency energy towards a body portion of said subject;

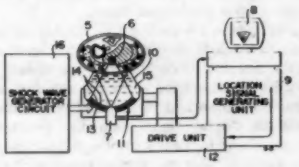
receiving means for receiving said frequency modulated beam as a motion-related, phase modulated reflected signal from said body portion; and

signal processing means for extracting the heart and respiration rates from said phase modulated reflected signal.

4,958,639
ULTRASONIC THERAPEUTICAL APPARATUS

Naoki Uchiyama, Hachiogi, Japan; Akio Nakada, Garden City Park, N.Y.; Akihiro Taguchi, Hamburg, Fed. Rep. of Germany; Shiaji Hatta; Syuichi Takayama; Takashi Tsukaya; Sakae Takehana; Naomi Sekino, and Masaaki Hayashi, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Japan

Continuation of Ser. No. 106,498, Oct. 8, 1987, abandoned. This application Nov. 8, 1989, Ser. No. 434,569
Claims priority, application Japan, Oct. 29, 1986, 61-257524; Oct. 30, 1986, 61-259331; Nov. 26, 1986, 61-282979; Nov. 26, 1986, 61-280980
Int. Cl.[5] A61B 8/14, 17/22
U.S. Cl. 128—660.03 **13 Claims**



1. An ultrasonic therapeutic apparatus, comprising:

(a) observation means for:

(1) continuously observing an area within a patient's body;

(2) generating a detection signal upon detection of a calculus located within said area; and

(3) continuously tracking the location of said calculus within said area;

(b) means responsive to said detection signal from said observation means for continuously providing a location signal based upon the location of said continuously tracked calculus;

(c) ultrasonic shock wave generating means for generating an ultrasonic shock wave to crush said calculus, said ultrasonic shock wave generating means including an array of ultrasonic shock wave emitting elements for directing said ultrasonic shock wave toward a focal point to crush said calculus; and

(d) focal point shifting means for automatically shifting said focal point in accordance with said location signal to crush said calculus; and

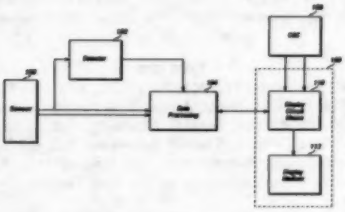
wherein said observation means includes observation wave generating means for generating an ultrasonic observation wave, said ultrasonic observation wave being used to determine the three-dimensional location of said calculus within said area of said patient's body, said observation wave generating means being cooperably associated with said ultrasonic shock wave generating means so that said ultrasonic observation wave and said ultrasonic shock wave are generated from substantially the same location.

4,958,640

METHOD AND APPARATUS FOR CORRELATING THE DISPLAY OF INFORMATION CONTAINED IN TWO INFORMATION SIGNALS

Charles H. Logan, Woodinville, Wash., assignor to SpaceLabs, Inc., Redmond, Wash.

Filed Dec. 23, 1988, Ser. No. 289,386
Int. Cl.[5] A61B 5/02
U.S. Cl. 128—671 **21 Claims**



1. An apparatus for displaying first and second information signals, each with reference to the occurrence of a predetermined phenomenon, comprising:

detection means for monitoring the first information signal to detect the predetermined phenomenon and for providing an interrupt signal in response thereto;

timing circuit means for providing at least one timing signal to create a timing reference frame;

data display means, responsive to a display signal, for providing a visual indication of a predetermined characteristic of the first and second information signals; and

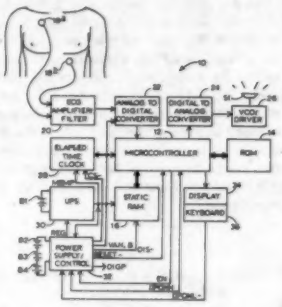
data processing means for receiving the first and second information signals and the at least one timing signal to provide the display signal, said data processing means being responsive to the interrupt signal and the at least one timing signal to alter the display signal such that the display of the second information signal is also altered thereby to indicate the occurrence of the predetermined phenomenon in real-time relationship with the display of the predetermined characteristic of the second information signal.

4,958,641

HEART DATA MONITORING METHOD AND APPARATUS

Dennis Digby, Wilsonville, and Habib Homayoun, Aloha, both of Oreg., assignors to Instromedix, Inc., Hillsboro, Oreg.

Filed Mar. 10, 1989, Ser. No. 321,736
Int. Cl.[5] A61B 5/04
U.S. Cl. 128—702 **6 Claims**



1. For use in ECG monitoring apparatus, a patient-adaptive QRS complex validation method comprising:

characterizing a patient's ECG pattern by sampling at the beginning and the end of plural sampling intervals between predefined analysis points an ECG signal for a predefined learning period of time and calculating a learned rate of change of such ECG signal over said intervals, and thereafter

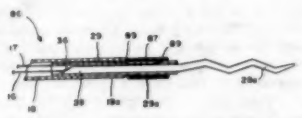
determining the validity of QRS complexes by sampling between such analysis points such ECG signal, calculating a measured rate of change of such ECG signal and comparing said measured rate of change with said learned rate of change.

4,958,642

GUIDE WIRE ASSEMBLY WITH ELECTRICAL FUNCTIONS AND MALE AND FEMALE CONNECTORS FOR USE THEREWITH

Jeffrey J. Christian, San Jose, and Menahem Nassi, Palo Alto, both of Calif., assignors to Cardiometrics, Inc., Mountain View, Calif.

Continuation-in-part of Ser. No. 265,909, Nov. 2, 1988. This application Sep. 22, 1989, Ser. No. 411,399
Int. Cl.[5] A61B 5/00
U.S. Cl. 128—772 **9 Claims**



1. In a guide wire assembly, a flexible guide wire having a diameter of 0.018 inches or less and having first and second conductors extending along the length thereof, a flexible cable having first and second conductors extending along the length thereof, and connector means for interconnecting the flexible cable to said guide wire and interconnecting the conductors carried thereby, said connector means including a male connector and a female connector, said male connector comprising a sleeve, a conductive core wire mounted in the sleeve, insulating means mounted din the sleeve and insulating the conductive core wire from the sleeve, a conductive cylindrical

coil spring means carried by the insulating means and spaced from the sleeve but being in relatively close proximity to the sleeve for providing stress relief, said core wire extending beyond the conductive cylindrical coil spring, first and second conductors disposed within the sleeve with the first conductor being connected to the conductive core and the second conductor being connected to the conductive cylindrical coil spring means, said female connector comprising an inner conductive grip having a cylindrical recess for receiving the conductive core wire, an outer conductive grip having a cylindrical member engaging portion, insulating means disposed between the inner and outer conductive grips, an insulating case mounted on the outer conductive grip, first and second conductors disposed within the case with the first conductor being connected to the inner conductive grip and the second conductor being connected to the outer conductive grip, the female connector receiving the male connector with the inner conductive grip receiving the conductive core in the cylindrical recess of the inner conductive grip and with the outer conductive grip receiving the conductive member of the male connector by the cylindrical member engaging portion of the outer conductive grip engaging the conductive cylindrical coil spring means.

4,958,643

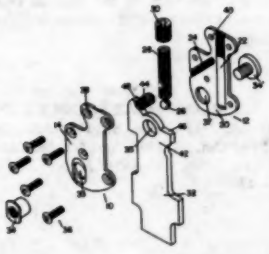
HINGE JOINT

Timothy Pansiera, 1050 NW. First Ave., Boca Raton, Fla. 33432

Filed Jun. 16, 1989, Ser. No. 367,367

Int. Cl.[5] A61F *5/00*

U.S. Cl. 128—80 H **3 Claims**



1. A hinge joint, comprising:

(a) a first planer element having therein a transverse rotational opening, said first planer element having an exterior and an interior surface, said interior surface including respective semi-cylindrical halves of a first linear channel and a second linear channel;

(b) a second planer element having therein a transverse rotational opening, said second planer element having an interior and an exterior surface, said second planer element being substantially symmetrical to said first planer element under the respective of interior surfaces of said planer elements are oriented as opposing falls to each other, said interior surface of said second planer element provided with respective semi-cylindrical halves of said first and second linear channels formed in said interior surface of said second planer element;

(c) a third planer element having a transverse axial opening on one end thereof, said end thereof proportioned for planer orientation between said interior surfaces of said first and second planer elements;

(d) means for securing said first and second planer elements at a uniform offset from each other;

(e) rotational coupling means for securement in said axial openings of said first, second and third planer elements, in which, when said coupling means is secured, said third planer element is rotationally moveable within the offset of the combination of said first and second planer elements;

(f) in said first linear channel formed by the combination of said semi-cylindrical halves of said first and second planer elements, means for selectably changing the angulation of a longitudinal axis of said third element relative to those axes defined by said first and second linear channels of said respective first and second planer element, said selectable changing means operating in a first rotational direction relative to an axis of said axial opening; and

(g) within said second linear channel, means for resiliently biasing, in a rotational direction opposite to that of said angulation changing means of said first channel, the rotational characteristic of said third planer element relative to the combination of said first and second planer elements.

4,958,644

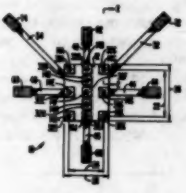
APPARATUS TO DISCOURAGE SUPINE SLEEP

David L. Rodgers, One Daniel Burnham Ct., San Francisco, Calif. 94109

Filed Nov. 15, 1988, Ser. No. 271,565

Int. Cl.[5] A61F *39/00*

U.S. Cl. 128—871 **12 Claims**



1. An apparatus usable for preventing interruption of a sleeper's respiration, comprising:

a support structure;

a plurality of pointed prods, attached to said support structure to position said plurality of prods in a two-dimensional array to permit contact of a plurality of said prods with the sleeper over an area said two-dimensional array defining; wherein said means for controlling the degree of sharpness comprises a layer of compressible material substantially surrounding at least a portion of each said plurality of pointed prod; and said layer is undercut at least in a region adjacent to one of said plurality of pointed prods, said one prod having a tip, said layer including a region adjacent said tip and a region spaced from said tip, said undercut region providing a hole having a frustoconical profile with a larger diameter in the region adjacent the tip than in the region spaced from the tip.

4,958,645

MULTI-CHANNEL DIGITAL MEDICAL TELEMETRY SYSTEM

Theodore E. Cadell, Waterloo, and Kevin Rabalais, Kitchener, both of Canada, assignors to CME Telemetrix Inc., Waterloo, Canada

Filed Nov. 16, 1988, Ser. No. 271,637

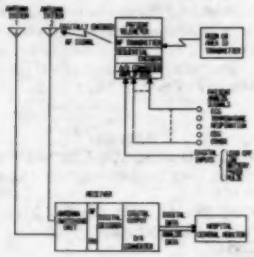
Claims priority, application United Kingdom, Nov. 18, 1987, 8726933

Int. Cl.[5] H04B *1/00*; G08C *17/00*

U.S. Cl. 128—903 **11 Claims**

1. A medical radio telemetry system for remotely monitoring patients, said system comprising a plurality of patient telemeters, each telemeter adapted to be mounted on a patient and having a transmitter and data collection means for obtaining patient data said transmitter being connected to said data collection means each transmitter having a transmitting antenna

system, room locator means for producing signals indicative of patient location, said data collection means including receiving means to receive said signals from the room locator transmitter means, said data collection means obtaining analog signals from the patient said collection means including means for converting said analog signals to digital signals for transmission via said transmitting antenna system, each transmitter having at least two channels, said medical telemetry system



having a receiving antenna system, a receiver and display means, said receiving antenna system being capable of receiving signals from the transmitters of the telemeters and being connected to transfer said digital signals to said receiver, said receiver being connected to means for converting said signals from digital signals to analog signals, if desired, for transfer to the display means, the transmitter, receiver and the transmitting and receiving antenna systems each having a power source.

4,958,646

METHOD FOR DRAPING CURTAINS

Christer Hannersbg, Hollviksnas, Sweden, assignor to AB A.S-vensson & Co., Malmö , Sweden

Continuation-in-part of Ser. No. 114,655, Oct. 28, 1987, abandoned. This application Jun. 22, 1989, Ser. No. 370,340

Claims priority, application Fed. Rep. of Germany, Oct. 29, 1986, 3636845; European Pat. Off., Oct. 12, 1987, 265759

Int. Cl.[5] A47H *13/14*

U.S. Cl. 160—348 **4 Claims**

1. A method for draping curtains comprising the steps of:

(a) attaching two holders to an upright wall, each holder having a C-shaped member positioned between and joining two prongs terminating in a curved surface portion at an upper end thereof, the C-shaped member being affixed to a bar member at an end of the C-shaped member opposite its opening, said bar member having means to attach the holder to a wall;

(b) placing a lengthwise folded curtain forming material defining a plurality of layers thereof over each bar member;

(c) pulling an upper layer of said lengthwise folded curtain forming material forwardly through the prongs of each holder; and

(d) pulling said upper layer of said curtain forming material rearwardly and upwardly over said curved surface portions of each holder to form two fabric rosettes and a draping arc between the fabric rosettes.

4,958,647

APPLICATOR FOR CONTINUOUS APPLICATION OF HAIR DYE

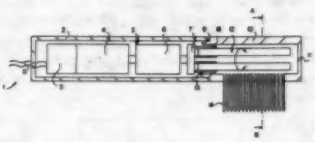
Peter Busch, Erkrath, and Klaus Thiele, Langenfeld, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Feb. 7, 1989, Ser. No. 307,440

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1988, 3803692

Int. Cl.[5] A45D *24/42*

U.S. Cl. 132—119.1 **6 Claims**



1. An applicator for the continuous application of a hair dye to the head hair of human beings comprises a tubular element containing a first absorbent material serving as a reservoir hair dye, and teeth of a second absorbent material inserted into said tubular element in a non-contacting manner with said first absorbent material, wherein for the transfer of the hair dye from the reservoir to the teeth, the reservoir is connected to a rotation mechanism.

4,958,648

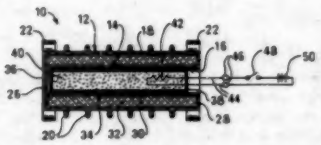
HAIR ROLLER AND HEAT SOURCE THEREFOR

Booker W. Morey, 2512 Cowper St., Palo Alto, Calif. 94301

Filed Oct. 26, 1988, Ser. No. 263,234

Int. Cl.[5] A45D *2/36*

U.S. Cl. 132—220 **19 Claims**



1. A hair roller assembly comprising,

a tubular roller member having a heatable inner surface and an outer surface suitable for winding hair therearound,

a container having a substantially rigid outer wall slidably engaged with the inner surface of the roller member for insertion into and removal from inside the tubular roller member, said container outer wall being in heat transferring relationship with the heatable inner surface of the roller member when the container is inserted in the roller member,

heat source means comprising consumable heat source material enclosed inside said container which is useable only once for generating heat when activated,

means inside the container for activating the consumable heat source material inside said container,

means under user control for controlling activation of the consumable material by the activating means for initializing consumption of the consumable heat source material for generation of heat inside said container, which heat is

transferred through the container wall to the heatable inner surface of the roller member for heating the roller member and hair wound thereon to an elevated temperature for a period of time for curling the hair, said container with consumed heat source material contained therein being removable from the roller member after use for reuse of the roller member with another container with consumable heat source material and activating means enclosed therein.

4,958,649

APPARATUS FOR TREATING ARTICLES WITH A GASEOUS AND/OR LIQUID MEDIUM

Lajos Pethö, Limoges, France, assignor to Kabivitrum AB, Stockholm, Sweden

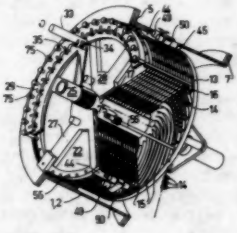
PCT No. PCT/SE89/00052, § 371 Date Oct. 16, 1989, § 102(e) Date Oct. 16, 1989, PCT Pub. No. WO89/07457, PCT Pub. Date Aug. 24, 1989

PCT Filed Feb. 9, 1989, Ser. No. 424,234

Claims priority, application Sweden, Feb. 16, 1988, 8800525

Int. Cl.[5] B08B *3/00*

U.S. Cl. 134—159 **7 Claims**



1. Apparatus for treating a plurality of articles with at least one fluid medium, said apparatus comprising a substantially cylindrical chamber which is provided with an article inlet opening and an article outlet opening, and further including at least one article holder device mounted in the chamber and intended for holding an ordered array of articles to be treated, each holder device has the form of a circular plate which has mounted thereon guide devices which comprise partition walls which are so arranged as to define channels or compartments in which the articles are arranged in rows along evolving lines extending from the centre of the plate to the periphery thereof; the plate being arranged to be rotated stepwise about a horizontal axis which is concentrical with the cylindrical chamber and perpendicular to the plate, such that the channels can be brought singly into communication with the article inlet opening or the article outlet opening.

4,958,650

WALKING AND SKIING AID

Hal J. Dale, 7 S. Arizona, Dillon, Mont. 59725

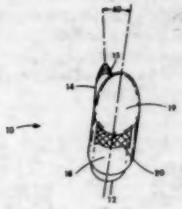
Filed Dec. 5, 1988, Ser. No. 279,879

Int. Cl.[5] A45B *1/00*

U.S. Cl. 135—65 **11 Claims**

1. A walking and skiing aid comprising:

an elongated rod having a handgrip adapted to be held in one of the right or left hand by a person having a direction of travel, said rod further having a n upper end portion, a middle portion, and a lower end portion, and wherein said upper end portion is angled forwardly relative to said direction of travel and canted inwardly towards said person from said middle portion when said hand grip is held in said one of said right or left hand and said lower end portion is angled forwardly towards said direction of



travel when said hand grip is held in said one of said right or left hand.

4,958,651

IMPACT CUSHIONING AND AVOIDING DEVICE

Emile G. Najm, 1281 Whitmore, Bloomfield Hills, Mich. 48013

Filed May 9, 1989, Ser. No. 349,166

Int. Cl.[5] A45B *9/04*

U.S. Cl. 135—82 **9 Claims**

1. An impact cushion readily attachable to a mobility cane of the type utilized by the visually impaired to investigate the surface of the ground prior to stepping on that portion of the ground, the mobility cane having a cane, and a handle attached to the top end of the cane, said impact cushion softening the shock when the movement of the cane is suddenly blocked, said impact cushion comprising:

a sleeve having a first end and a second end, said first end adaptable telescopically about one end of the cane, a shaft telescopically received within said second end of said sleeve and moveable relative to the sleeve, a spring means disposed within said sleeve for resiliently urging said shaft telescopically outwardly relative to said second end of said sleeve, a bushing attached to said second end of said sleeve for retaining said shaft slidable inside said sleeve.

4,958,652

PORTABLE SUN SHADE

Rachel Maya, 441 N. Curson Ave., Los Angeles, Calif. 90036

Continuation-in-part of Ser. No. 159,811, Feb. 24, 1988, Pat. No. 4,823,822. This application Mar. 28, 1989, Ser. No. 329,540

The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.

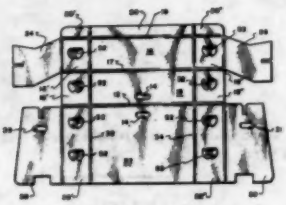
Int. Cl.[5] E04H *15/00*

U.S. Cl. 135—87 **6 Claims**

1. A portable apparatus for use as shelter for protection against sunshine and wind comprising:

a homogeneous sheet of lightweight material having creases forming hinges connecting a roof panel, a back panel and side panel means; said side panel means when folded at approximately right angles to said back panel holding said

homogeneous sheet in a upright position, means for securing said side panel means at said approximately right angles to said back panel; said means for securing said side panel means at said approximately right angels to said back panel comprising interlocking means for interlocking said side panel means with said roof panel to hold said side panel means substantially at right angles to said roof panel; said roof panel and back panel being approximately equal



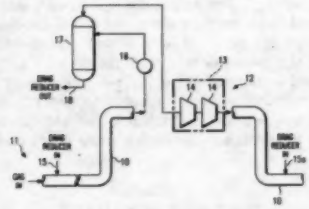
in area; said side panels constructed to fold flat against said roof panel and said back panel respectively so that said roof panel and back panel can be folded inward against each other with said side panels inside; whereby said homogeneous sheet of lightweight material may be held upright to form a shelter by interlocking side panel means with said roof panel and folded into a flat rectangular shape which can be easily carried when not in use.

4,958,653

DRAG REDUCTION METHOD FOR GAS PIPELINES

Frank E. Lowther, Plano, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jan. 29, 1990, Ser. No. 471,584
Int. Cl.[5] F17D *1/17*
U.S. Cl. 137—13 **10 Claims**



1. A method of reducing drag for a gas flowing in a pipeline between a first point and a second point, said method comprising:

inputting gas at a constant pressure into said pipeline at said first point to establish gas flow in said pipeline between said first and second points;

injecting a drag reducer into said gas flow at said first point;

monitoring the flowrate of said gas at said second point; and

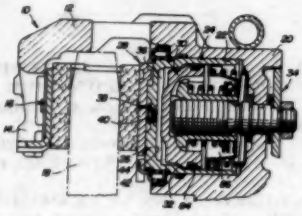
adjusting the injection rate of said drag reducer at said first point until a maximum flowrate of said gas is reached at said second point.

4,958,654

CHECK VALVE WITH EPHEMERAL SEAL

Charles T. Hoffman, Jr., Springboro, Ohio; John W. Altenburger, Dearborn, Mich., and John A. Ramos, Utica, Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 3, 1989, Ser. No. 375,326
Int. Cl.[5] F16K *17/40*
U.S. Cl. 137—72 **2 Claims**



1. A method of inhibiting the opening of a normally closed check valve and removing that inhibition upon the attainment of a predetermined check valve operating condition, said method comprising the steps of:

(1) assembling mechanism including a normally closed check valve in operative relation and applying a high viscosity ephemeral seal material to an entry chamber of the check valve during such assembly so as to inhibit the opening of the check valve to permit fluid flow therethrough when a differential fluid pressure is applied to one side of the check valve normally tending to so open the check valve;

(2) applying a subatmospheric air pressure to the exit side of the check valve to establish an air pressure differential across the check valve and the ephemeral seal material in excess of the air pressure differential required to open the check valve when no ephemeral seal material is present, bleeding air from that side and from other portions of the assembled mechanism while blocking the opening of the normally closed check valve with the ephemeral seal material;

(3) charging a portion of the assembled mechanism with a hydraulic fluid while keeping the hydraulic fluid physically separated from the check valve and the ephemeral seal material;

(4) and afterward operating the assembled mechanism in a manner to create the predetermined check valve operating condition in which sufficient heat is applied to the ephemeral seal material in the check valve entry chamber to cause the ephemeral seal material to reach a temperature above which the ephemeral seal material becomes sufficiently viscous to flow out of and away from the check valve entry chamber and so removing the ephemeral seal material from the check valve entry chamber, thus removing the inhibition to the opening of the check valve at an air pressure differential acting thereacross which is substantially less than the air pressure differential established across the check valve and the ephemeral seal material in step (2).

4,958,655

MULTIPLE FILL LEVEL VEHICLE FUEL SYSTEM

Michael J. Danek, Laingsburg, Mich., assignor to General Motors Corporation, Detroit, Mich.

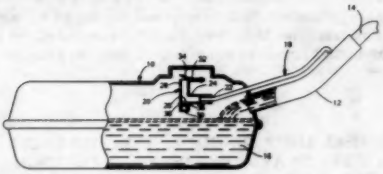
Filed Feb. 20, 1990, Ser. No. 482,133
Int. Cl.[5] F16K *24/04*
U.S. Cl. 137—80 **3 Claims**

1. In a vehicle fuel tank of the type having a vent pipe for venting said tank as it is filled, a temperature responsive valve

for providing two different fuel fill levels in said tank, said valve comprising,

a pair of inlets opening to said vent pipe at different levels within said tank,

a fuel level responsive seal for closing off one of said inlets when fuel reaches the level of said first inlet, and,



a temperature responsive seal for closing off the other of said inlets when the temperature in said tank is beyond a predetermined threshold,

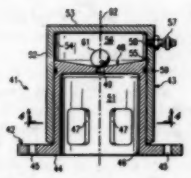
whereby, the fuel level may be selectively switched from the level of one of said inlets to the other by allowing tank venting to occur until fuel reaches the level of one inlet or the other depending on whether the tank temperature is beyond said threshold.

4,958,656

PRESSURE RELIEF VALVE

Ajitkumar G. Patel, Oxford, Ohio, assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 29, 1989, Ser. No. 374,081
Int. Cl.[5] F16K *17/12, 31/124*
U.S. Cl. 137—467 **21 Claims**



1. A relief valve adapted to be joined to a pressurized fluid container to protect the fluid container against internal fluid pressure above a predetermined value, the relief valve comprising:

a valve body having first and second ends spaced apart from each other along the longitudinal axis of the valve body, the valve body having a first chamber formed therein, the valve body having an outer wall surface extending around the periphery of the valve body between the first and second ends of the valve body, the outer wall surface of the valve body having at least one fluid pressure relief opening therein which is in fluid communication with said first chamber, the first end of said valve body having an opening therein in fluid communication with said first chamber and adapted to provide fluid passage into said first chamber from said pressurized fluid container, the second end of the valve body having an opening therein in fluid communication with said first chamber, the area of the opening in the second end of the valve body being substantially smaller than the area of the second end of the valve body;

a valve sleeve member closed at one end by a cap wall and open at the opposite end, the valve sleeve member having an inner wall surface which corresponds to said outer wall surface of the valve body so as to permit the valve sleeve member to encompass the outer wall surface of the valve body with the inner wall surface of the valve sleeve member being in slidable engagement with the outer wall surface of the valve body between a closed position and an open position with the relative motion therebetween being at least generally parallel to the longitudinal axis of the valve body so that in closed position said at least one fluid pressure relief opening is at least substantially sealed by the valve sleeve member and in said open position said at least one fluid pressure relief opening is not blocked by the valve sleeve member, a second chamber located within said valve sleeve member and being at least generally defined by the second end of the valve body, said cap wall and said inner wall surface of the valve sleeve member;

a pressure actuatable element positioned to block said opening in the second end of the valve body when the fluid pressure in said first chamber in the valve body is below said predetermined value and to unblock said opening in the second end of the valve body when the fluid pressure in said first chamber in the valve body is above said predetermined value, thereby permitting fluid to pass from the pressurized fluid container through said first chamber and the opening in the second end of the valve body into said second chamber when the fluid pressure in the pressurized fluid container exceeds said predetermined value, with the resulting increase in pressure against the cap wall of the valve sleeve member causing the movement of the valve sleeve member from said closed position to said open position to thereby vent fluid from the pressurized fluid container through said first chamber and said at least one fluid pressure relief opening in the outer wall surface of the valve body,

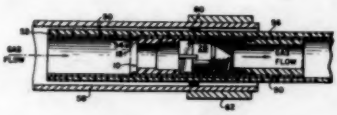
wherein said pressure actuatable element is a rotatable body having dimensions greater than the corresponding dimensions of said opening in the second end of the valve body.

4,958,657

GAS SUPPLY SAFETY DEVICE

Thomas E. Hagan, and John B. McGowan, Sr., both of Malvern, Pa., assignors to Umac Incorporated, Exton, Pa.

Filed May 11, 1989, Ser. No. 350,351
Int. Cl.[5] F16K *17/30*
U.S. Cl. 137—513.5 **17 Claims**



3. In a combustible gas supply line for passing a continuous or intermittent supply of natural or other consumer gas from a source thereof to a combustible-gas user, comprising a gas supply pipe having opposite ends and a safety flow limitor spaced along said pipe, the improvement wherein said safety flow limitor has a modular construction comprising:

a cylindrical shell having a generally uniform outer wall surface of consistent outer diameter, said gas supply pipe being unitary and having an inner diameter substantially equal to the outer diameter of said shell, and said shell being fixed within said unitary gas supply pipe between the ends thereof;

said cylindrical shell having an internal wall surface defining an internal passageway extending axially therethrough, and an annular valve-seat along said passageway;

a valve head member positioned within said passageway and capable of axial movement between said valve-seat and an upstream position, and said valve head having an annular surface for mating with said annular valve-seat, a body portion extending upstream from said annular surface, and guiding fin means upstream from said body portion for radially centering said valve head within said passageway;

a coil spring for biasing said valve head toward said upstream position and away from said valve seat; and

means to permit bleed-by flow of combustible gas past said flow limitor when said annular surface of said valve head is in mating relationship with said annular valve-seat.

4,958,658

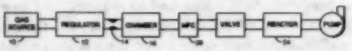
MASS FLOW STABILIZED

John P. Zajac, San Jose, Calif., assignor to Tegal Corporation, Petaluma, Calif.

Filed Jun. 25, 1987, Ser. No. 66,801

Int. Cl.[5] E03B 5/00

U.S. Cl. 137—613 2 Claims



1. In a gas delivery system wherein a mass flow controller is connected in a gas line between a source of gas and a device in which the gas is used, the improvement comprising a mass flow stabilizer interposed in said line for dampening small pressure fluctuations, said mass flow stabilizer comprising restriction means connected to said source, wherein said restriction means is characterized by a flow rate slightly greater than that of said mass flow controller, and chamber means connected to said restriction means and said mass flow controller.

4,958,659

PRESSURING AND PURGING APPARATUS

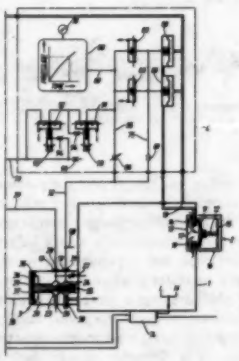
Dennis S. Dowdall, Morden, England, assignor to Telektron Limited, Surrey, England

Filed Oct. 17, 1989, Ser. No. 422,422

Claims priority, application United Kingdom, Oct. 17, 1988, 8824276

Int. Cl.[5] B65D 25/00

U.S. Cl. 137—624.12 21 Claims



1. An apparatus for pressurising and purging with gas the interior of an enclosure, comprising purge valve means for controlling communication between a source of pressurised gas and the enclosure interior for gas to enter the enclosure either at a relatively high flow rate for purging or at a substantially reduced flow rate for maintaining a positive pressure in the enclosure, and pneumatically operable control means for operating the purge control valve, whereby gas initially enters the enclosure at said reduced flow rate, upon the enclosure pressure reaching a given pressure level the purge valve means is opened for gas to enter the enclosure at said high flow rate, and the purge valve means is closed so that gas enters the enclosure at the reduced flow rate again after the purging gas flow has been established for a certain time, wherein the purge valve means comprises a valve body adapted to be mounted directly on a wall the enclosure with port means provided in a face of the valve body registering with orifice means in said wall for communicating the pressurising and purging apparatus directly with the enclosure interior, and the valve body carries the pneumatic control means and constitutes a manifold providing communication between different parts of the control means and communication thereof with the chamber enclosure.

4,958,660

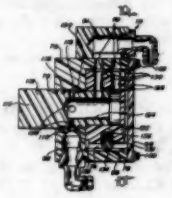
CLOSED LOOP FUNCTION SELECTOR VALVE

Daniel A. Eke, 234 Amber Lake Dr.; Alan B. Eke, 179 Bellevue Rd., both of Fairmont, Minn. 56031, and Earl W. Johnson, R.R. 1, Dunnell, Minn. 56127

Continuation of Ser. No. 121,299, Nov. 15, 1987, abandoned. This application Feb. 6, 1990, Ser. No. 476,134

Int. Cl.[5] F16K 11/12; A47K 3/22

U.S. Cl. 137—625.23 6 Claims



1. A closed loop function selector valve which directs hydraulic fluid pressure to any one of several hydraulic related devices wherein the low pressure drains or returns of all of the devices are directed back through the valve, comprising

(a) a hollow valve body having a t least two function selector ports therein hydraulically connected to any of the devices, a high pressure line input port and a valve drain output port;

(b) a selector moveably seated within the valve body having a line pressurized chamber within the valve body which is in constant flow communication with the hydraulic pressure directed into the valve by way of the line input port;

(c) a chamber exit port within the selector arranged to be alignable with one of the function selector ports for flow communication therewith while the other function selector port is in flow communication with the valve rain output port within the valve body; and

(d) detent means on the selector diametrically opposing the chamber exit port and within said valve body for releasably interlocking the selector into any one of its operational positions wherein the chamber exit port is in communication with one of the two function selector ports.

4,958,661

CHECK VALVE

Ludwig K. Holtermann, Old Saybrook, and Leighton Lee, II, Guilford, both of Conn., assignors to The Lee Company, Westbrook, Conn.

Filed Aug. 8, 1989, Ser. No. 391,142

Int. Cl.[5] F16K 15/14

U.S. Cl. 137—843 5 Claims

1. A flow control valve comprising:

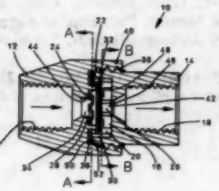
a. housing means having an inlet end and an outlet end and defining an axial flow passage therebetween comprising an inlet flow passage and an outlet flow passage and a central chamber of increased diameter intermediate be-

tween and communicating with both the inlet flow passage and the outlet flow passage;

b. valve seat means comprising an annular ridge with a full radius rounded surface protruding toward the outlet end, concentric with and surrounding the opening through which the inlet flow passage communicates with the central chamber;

c. A flexible disc comprised of an elastomeric material transversely positioned across the central chamber and releasably engageable with the valve seat means to prevent the flow of fluid media through the flow passage from the outlet end to the inlet end;

d. means for prebiasing the disc against the valve seat means comprising a plurality of coaxial, angularly displaced tubular sectors with inside radii about equal to that of the



outlet flow passage, forming a discontinuous annulus that surrounds and extends toward the inlet end from the opening of the outlet flow passage into the central chamber, wherein axially extending slots separate the sectors of the disc prebiasing means and define means for providing fluid communication between the outlet flow passage and the central chamber, and the disc prebiasing means further comprise shoulders that protrude radially outward from the disc prebiasing means for limiting the axially downstream and radially inward deformation of the disc; and

e. support means for preventing the central portion of the disc from being forced into the inlet flow passage, the support means partially surrounding the opening of the inlet flow passage into the central chamber radially central to the valve seat means and protruding toward the outlet end of the valve.

4,958,662

PICK EXTRACTING DEVICE WITH ROTATIVE DRIVE

Yujiro Takegawa, Uchinada, Japan, assignor to Tsudakoma Corporation, Kanazawa, Japan

Filed Apr. 6, 1989, Ser. No. 334,865

Claims priority, application Japan, Apr. 6, 1988, 63-84570

Int. Cl.[5] D03D *49/00*

U.S. Cl. 139—116.2 **4 Claims**

1. A weft yarn extracting device comprising:

an extracting means for gripping one end of a weft yarn to be extracted and for winding the weft yarn to extract same from a cloth fell;

a first shifting means for shifting the extracting means between a standby position where the extracting means is kept standing by and an operating position where the extracting means grips the weft yarn; and

a second shifting means for shifting the extracting means located at the operating position away from the cloth fell;

wherein said extracting means comprises: a holding member; a tubular case attached to the holding member; a rotary tube rotatably supported in the tubular case and provided with an axial bore; a nozzle axially slidably and rotatably supported in the tubular case opposite to the rotary tube so as to be moved axially toward and away from the rotary tube and including means for of jetting air to suck the weft yarn into the interior of the tubular case and to eject the weft yarn extracted from the cloth fell; and a rotative driving means for rotating the rotary tube and the nozzle.

4,958,663

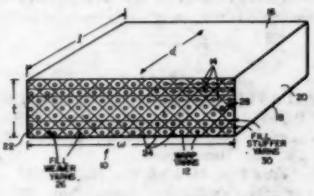
WOVEN MULTI-LAYER ANGLE INTERLOCK FABRICS HAVING FILL WEAVER YARNS INTERWOVEN WITH RELATIVELY STRAIGHT EXTENDING WARP YARNS

Wilbur T. Miller; Dominic P. Calamito, both of Rancho Palos Verdes, and Richard H. Pusch, Huntington Beach, all of Calif., assignors to Hitco, Cleveland, Ohio

Filed Aug. 15, 1988, Ser. No. 232,450

Int. Cl.[5] D03D *11/00, 13/00*

U.S. Cl. 139—384 R **20 Claims**



1. A woven fabric having a thickness between opposite broad surfaces and comprising a plurality of warp yarns extending generally in a common direction and arranged into a plurality of warp yarn layers between the opposite broad surfaces of the fabric and a plurality of fill yarns extending through the thickness of the fabric from one of the opposite board surfaces to the other of the opposite broad surfaces and being interwoven with the plurality of warp yarns, the fill yarns being arranged into generally planar fill yarn sheets which extend through the thickness of the fabric and form acute angles with the plurality of warp yarn layers and with the opposite broad surfaces.

4,958,664

AIR JET LOOM WITH A JACQUARD FRAME AND A VARIABLE DRAWING-IN WIDTH

Othmar Oppl, Hergensweiler, Fed. Rep. of Germany; Wilhelm Rupp, Hoerbranz, Austria, and Adnan Wahhoud, Bodolz, Fed. Rep. of Germany, assignors to Lindauer Dornier Gesellschaft GmbH, Lindau/Bodensee, Fed. Rep. of Germany

Filed Mar. 14, 1989, Ser. No. 323,441

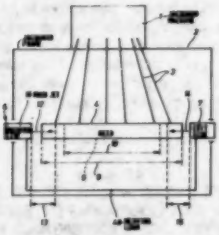
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1988, 3809631

Int. Cl.[5] D03D *47/30, 47/40*

U.S. Cl. 139—435.1 **9 Claims**

1. An air jet weaving loom comprising changeable length reed means (4, 5) arranged centrally in said weaving loom, a jacquard machine (1) arranged above and symmetrically to a center of said reed means, said jacquard machine providing harness threads (3) to a centered and symmetric drawing-in width of said reed means, weft thread insertion means on an

insertion side of said loom for inserting a weft thread into a loom shed, position adjustable weft thread catch means on an exit side of said air jet weaving loom, means for adjusting the position of said weft thread insertion means back and forth in the weft thread insertion direction (12) on the air jet weaving loom (48), so that adjustments on said insertion side and on said exit side together maintain said drawing-in width centered and



symmetric independently of a changed length of said reed means, said air jet weaving loom further comprising weft thread scissors (36), auxiliary selvage means (51) for forming a selvage (53), a weft thread clamp, and means for movably and adjustably mounting said scissors, said auxiliary selvage means, and said weft thread clamp on said weft thread insertion side for maintaining said drawing-in width centered and symmetric.

4,958,665

APPARATUS FOR ADJUSTING LEVEL OF LIQUID TO BE FILLED INTO PACKAGING TUBE

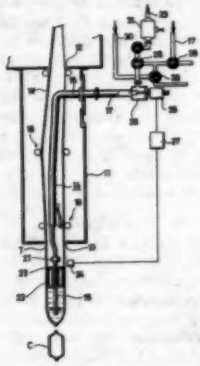
Fumiyuki Iwano, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Itano, Japan

Filed Nov. 16, 1988, Ser. No. 271,789

Claims priority, application Japan, Nov. 20, 1987, 62-177705[U]

Int. Cl.[5] B65B *3/30*

U.S. Cl. 141—95 **5 Claims**



1. In a packaging machine having a vertical portion of a filing pipe adapted to be enclosed by a packaging tube formed from a web of packaging material, and fill a liquid into the tube to a predetermined level from a lower end opening of the vertical portion, an apparatus for adjusting the level of the liquid to be filled into the packaging tube, comprising:

a flow control valve for controlling the flow of the liquid to be supplied to the filling pipe,

a float slidably suspended by the filling pipe into the liquid filled in the tube,

a magnet attached to the float,

a magnetic sensor for detecting from outside the tube variations in the intensity of magnetism due to the upward or downward movement of the magnet to produce an output signal, and

a control unit for controlling the setting of the flow control valve in accordance with the output signal of the magnetic sensor.

4,958,666

STORAGE CANISTER FOR PROCESS LIQUIDS FOR USE IN AN APPARATUS FOR WET PROCESSING OF PHOTOGRAPHIC MATERIAL

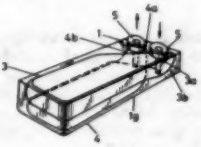
Franz Kocourek; Hans Ketterer; Alfons Kastl, and Rudolf Leistl, all of Munich, Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Nov. 28, 1988, Ser. No. 277,003

Claims priority, application Fed. Rep. of Germany, Dec. 17, 1987, 3742821

Int. Cl.[5] B65B *3/17*

U.S. Cl. 141—114 **9 Claims**



1. A device for storing process liquids such as baths for the wet processing of photographic materials, comprising a flat, rectangular receptacle defining two opposite broad sides each having two opposite narrow edges, one of said broad sides having two apertures arranged side by side near to one of said narrow edges; two pouches of an elastic, leakage proof material arranged one above the other in said receptacle, one of said pouches being expandable while the other pouch being collapsible to such an extent that their combined volumes correspond approximately to the volume of said receptacle; each of said pouches having a converging end portion terminating at said one narrow edge opposite an assigned aperture; said converging neck portions crossing one another and being formed, respectively, with an open neck part extending toward the assigned aperture and being closed by a control valve passing through the aperture; and said control valves being fastened to said one broad side.

4,958,667

TUBE HOLDER FOR TUBE FILLING MACHINES

Wesley J. Rece, California, Ky.; Martin M. Wildmoser, Florence, both of Ky., and Eric W. Scarpa, Cincinnati, Ohio, assignors to R. A. Jones & Co., Inc., Covington, Ky.

Filed Jul. 17, 1989, Ser. No. 380,307

Int. Cl.[5] B65G *47/24*

U.S. Cl. 141—165 **5 Claims**

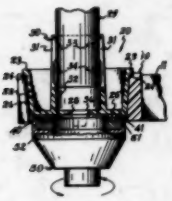
5. A tube holder which is receivable by a circular rotator having a serrated rim and a central magnet comprising:

a plastic cup-shaped section having a bottom wall which has an underside,

a plastic gripper for holding said tube projecting upwardly from said bottom wall,

a serrated rim projecting downwardly from said bottom wall, and

a ring of magnetically-attractable material secured to the underside of said bottom wall,



said rim being engageable by a mating serrated rim of a rotator that has a central magnet that holds said holder onto said rotator.

4,958,668

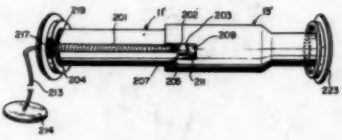
VARIABLE FLOW VALVE EQUIPPED SAFETY SPOUT

Leandre Vachon, 1'Aéroport, Thetford Mines, 2549 Chemi De, Quebec, Canada

Continuation-in-part of Ser. No. 561,454, Dec. 14, 1983, abandoned. This application Mar. 5, 1986, Ser. No. 836,520

Int. Cl.[5] B67C *3/00*

U.S. Cl. 141—291 **10 Claims**



1. A detachable pouring spout for transferring liquid from a filling container to a receiving container, comprising:

(a) an inlet tube for receiving liquid from the filling container, said inlet tube having an inlet portion provided with means for attaching said inlet tube to the filling container, and a main portion;

(b) an outlet tube operatively coupled to said inlet tube for guiding liquid therefrom into the receiving container, said outlet tube having a collar-like portion telescopically mounted onto said main portion of said inlet tube, and a short outlet portion of smaller diameter than said inlet tube;

(c) a valve comprising a valve head; means for connecting said valve head to said outlet tube, said connecting means comprising an apertured plate extending across a lowermost end of said collar-like portion of said outlet tube and a pin having one end connected to a central portion of said apertured plate and another end connected to said valve head; and a valve seat disposed at substantially a lowermost end of said main portion of said inlet tube, whereby spillage of liquid contained in the spout is prevented;

(d) a spring mounted within said collar-like portion of said outlet tube between the apertured plate and the lowermost end of the main portion of said inlet tube for biasing said valve in a normally closed position; and

(e) at least one stop responsive to an upward force and mounted externally on a surface of said lowermost end of said collar-like portion of said outlet tube for opening said valve,

wherein the main portion of the inlet tube and the collar-like portion of the outlet tube have a coaxis and wherein both the inlet portion of the outlet tube and the outlet portion of the outlet tube downstream of the valve extend at angles substantially less than 90° with respect to said coaxis.

4,958,669

DEVICE FOR FILLING SPECIFIED AMOUNT OF LIQUID

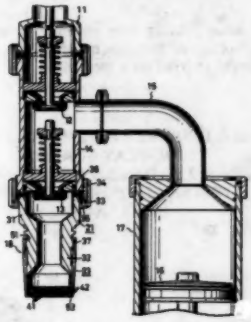
Shohei Ohta, Tokushima, Japan, assignor to Shikoku Kakoki Co., Ltd., Tokushima, Japan

Continuation of Ser. No. 180,921, Apr. 13, 1988, abandoned. This application Jul. 28, 1989, Ser. No. 385,957

Claims priority, application Japan, Apr. 14, 1987, 62-56505[U]

Int. Cl.[5] B67C *3/20*; B65B *3/12*

U.S. Cl. 141—311 A **12 Claims**



1. A plurality of perforated plates for use in a liquid filling device, said plurality of perforated plates arranged adjacent one another, each of said perforated plates, comprising a plurality of warp portions and weft portions so as to provide a plurality of fine perforations therebetween, said plurality of warp portions and weft portions being directly connected to each other at intersection points so as to prevent overlapping of said plurality of warp and weft portions to thereby allow effective cleaning and sterilizing of said plurality of perforated plates; and a spacer arranged within a spacing between adjacent perforated plates; wherein an opening ratio of each of said plurality of perforated plates is substantially 50 percent or more to thereby prevent liquid from flowing therethrough by gravity through surface tension of said liquid against said plurality of warp portions and weft portions, said opening ratio of each of said plurality of perforated plates being the ratio of the total volume of openings of said plate to the total volume, inclusive of said openings, of said plate.

4,958,670

TREE FELLING APPARATUS

Calvin S. Johnson, Union Grove, N.C., assignor to CTR Manufacturing, Inc., Union Grove, N.C.

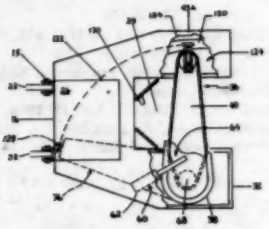
Filed Feb. 5, 1990, Ser. No. 475,133

Int. Cl.[5] A01G *23/08*; B27B *17/08*

U.S. Cl. 144—34 R **14 Claims**

1. An apparatus for felling trees, comprising a generally U-shaped base means having a main body and a pair of arm members extending from said main body in laterally spaced relation defining therebetween an open cutting area for receiving a trunk portion of a tree to be felled, and saw means pivotably mounted to one of said arm members for tree cutting movement through said cutting area between a retracted position extending from said one arm member toward said main body and a cutting position extending through said cutting area from said one arm member toward the other said arm member, said saw means having a guide portion at a distal end radially outwardly from the pivot mounting location of said saw means,

said other arm member including saw tracking means for defining a tracking area for confined receipt of said guide portion of



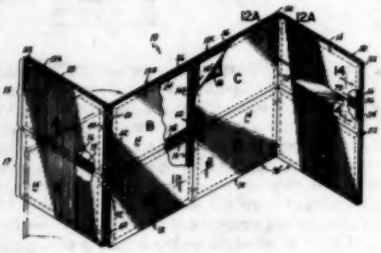
said saw means during tree cutting movement thereof for limiting deflection of said saw means which may be caused by reactive forces exerted by a tree being cut.

4,958,671

FOLDABLE DISPLAY SYSTEM WITH CONTINUOUS DISPLAY SURFACE

Thomas A. Bove, 1154 Herschel Ave., Cincinnati, Ohio 45208

Filed Sep. 12, 1989, Ser. No. 406,369
Int. Cl.[5] A47G 5/00
U.S. Cl. 160—135 26 Claims



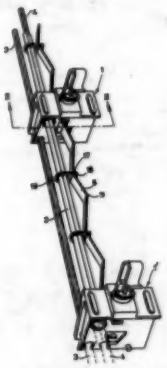
1. A portable display system comprising:
a plurality of display panels having front and rear surfaces;
a plurality of vertical and horizontal frame elements defining an array of panel support frames,
each said frame element having inner and outer edges, front and rear surfaces and opposite ends,
at least said front surface of each said frame element having a front channel therein,
means joining each said frame element at its opposite ends to two perpendicularly adjacent frame elements so as to form a rectangular panel support frame;
means hingedly joining adjacent vertical frame elements of said panel support frames such that said array of support frames is reconfigurable from a folded, portable position to an unfolded, display position; and
means for releasably securing each said display panel to a panel support frame with the peripheral edges of said panel and the outer edges of said frame being in aligned registration with each other so as to provide a substantially continuous and unbroken display surface when said array of support frames is in an unfolded, display position,
said securing means including a first member located in said front channel and a second member attached to the rear surface of said display panel,
said second member adapted to seat in said front channel and being located relatiVe to the peripheral edges of said panel such that when said second member is seated in said front channel, said peripheral edges of said panel are in said aligned registration with said outer edges of said panel support frame, said first and second members being magnetically attractive to each other to releasably secure said display panel to said support frame in aligned registration therewith.

4,958,672

SUSPENSION SYSTEM FOR VERTICAL BLINDS

Pieter N. Meyer, Kromme Akkers 1, 4171 BM Herwijnen, Netherlands

Filed May 11, 1988, Ser. No. 192,481
Claims priority, application Netherlands, Jan. 8, 1988, 8800049
Int. Cl.[5] E06B 9/36
U.S. Cl. 160—168.1 4 Claims



1. In a vertical blind suspension system having a track partially open at one side with slides disposed therein and having slat-suspending hooks depending through the partially open side and a non-circular drive rod disposed in the track and connected to the slides in such manner that the slides are movable along the drive rod and the slat suspension hooks are rotated by rotating the drive rod and a cord system disposed within the track and connected to an end slide and operable in opposite directions for displacing the slides along the track;
the suspension system characterized by accordion-folded strips of flexible material having a predetermined length;
each of said accordion-folded strips being disposed within the track and connected at opposite ends to each adjacent slide for distension to space said slides apart along said predetermined length and drawing them along the track in response to operation of the cord system in one direction and being collapsible upon themselves to stack the slides together in response to operation of the cord system in the opposite direction; each accordion-folded strip including a plurality of bending points intermediate its opposite ends; and
attachement means for loosely slidably attaching at least one of said bending points of said accordion-folded strip to the drive rod for suspension therefrom.

4,958,673

PAPERMAKING MACHINE AND A SEAMED PAPERMAKER'S FABRIC

Marcel Dufour, Saint Yrieix, France, assignor to Asten Group, Inc., Charleston, S.C.

Continuation of Ser. No. 822,292, Jan. 24, 1986, Pat. No. 4,683,624. This application Feb. 12, 1987, Ser. No. 14,026
Claims priority, application France, Sep. 11, 1985, 85 0234
Int. Cl.[5] D21F 7/10
U.S. Cl. 162—358 3 Claims

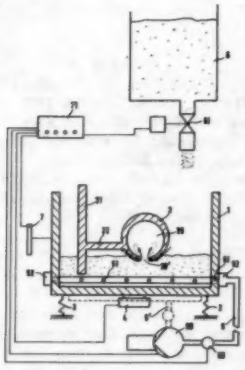
1. The combination of a seamed wet press felt and a papermaking machine having a least one pair of pressure rollers through which the paper sheet must be transported, said wet press felt having a base fabric with end loops which are intermeshed and joined in the seam and a layer of batt material which was needled to the base fabric and cut adjacent the seam area prior to installation on the machine and then refelted after installation so as to eradicate the cut and provide a batt layer having a continuous, homogenous paper supporting surface throughout its length.

4,958,674

FULL MOLD CASTING PROCESS AND DEVICE

Joachim Bolle, Ingolstadt, Fed. Rep. of Germany, assignor to Schubert & Salzer Maschinenfabrik Aktiengesellschaft, Ingolstadt, Fed. Rep. of Germany

Continuation of Ser. No. 163,385, Mar. 2, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,839
Claims priority, application Fed. Rep. of Germany, Mar. 9, 1987, 3707467
Int. Cl.[5] B22C 9/04, 15/22
U.S. Cl. 164—456 18 Claims



1. A full mold metal casting process, comprising the following steps:

(a) supporting at least one model which is composed of a thermally decomposable material which has at least one cavity therein and which has only one opening on a lower surface of said model, within a molding box above the bottom of said molding box;

(b) filling said box with sand until it reaches the level of said opening in said model;

(c) maintaining the level of said sand at the level of said opening until said cavity is filled with sand;

(d) creating a pressure differential wherein the pressure in said sand is different than the pressure outside of said sand to cause said sand to flow into, and to fill said cavity; and

(e) maintaining said pressure differential and the level of said sand constant until said cavity is filled so that the flow path of the sand into said cavity is not submerged in the sand itself until said cavity is completely filled.

13. A full mold metal casting device, comprising:

(a) a molding box for holding sand;

(b) means for supporting a positive model composed of a thermally decomposable material which has only one cavity opening in a lower surface of said model at a level above the bottom of said box;

(c) means for filling said box with sand to the level of said opening in said cavity;

(d) means for creating a pressure differential wherein the pressure within said sand is lower than the pressure within said box above said sand; and

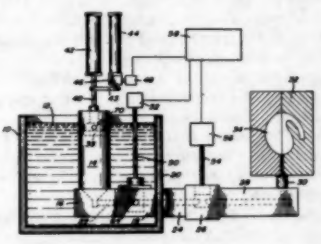
(e) control means for controlling and maintaining the level of said sand at the level of said opening, and for maintaining said pressure differential until said cavity is filled so that the flow path of sand into said cavity is not submerged until said cavity is completely filled with sand.

4,958,675

METHOD FOR CASTING METAL ALLOYS WITH LOW MELTING TEMPERATURES

Thomas F. Kidd, Candiac, Canada, assignor to Electrovert Ltd., Toronto, Canada

Filed Nov. 8, 1988, Ser. No. 268,492
Int. Cl.[5] B22D 17/00
U.S. Cl. 164—120 3 Claims



1. In a method of producing a casting from a molten metal alloy having a melting point below about 350° C., including an injection cylinder having an injection piston therein, and means to raise and lower the piston in the cylinder, the injection cylinder having an injection passageway containing molten metal alloy, passing through a molten metal alloy tank to inject molten metal alloy from the tank into a die, the improvement comprising the steps of:

closing the passageway from the injection cylinder to the die;

filling the injection cylinder with molten metal alloy from the tank through a valve port located in the injection passageway at an elevation lower than the cylinder, by raising the piston in the cylinder;

closing the valve port in the injection passageway and opening the passageway from the injection cylinder to the die;

lowering the piston in the cylinder after the passageway is open so no prepressurization occurs in the cylinder or passageway prior to injection, the piston being lowered at a controlled rate so that substantially no pressure occurs in the die during injection, and

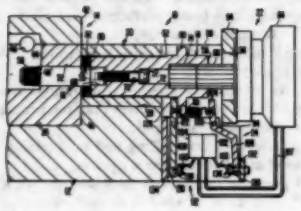
applying pressure to the piston after the injection step to pressurize the molten metal alloy in the die during solidification of the casting.

4,958,676

DIE CASTING APPARATUS FOR CASTING ARTICLES WITH AN INTERNALLY THREADED BORE

Robert J. Kuntz, Macungie, Pa., assignor to Hubbell Incorporated, Orange, Conn.

Filed May 30, 1989, Ser. No. 358,071
Int. Cl.[5] B22D *17/24*
U.S. Cl. 164—340 **16 Claims**



16. A die casting apparatus for casting an article with an internally screw-threaded bore, comprising:

a support;

a die, coupled to said support, having a first opening, a second opening and a cavity therein for receiving casting material through said first opening;

a core pin having first and second ends, said first end having external threads with a predetermined pitch thereon, said core pin being slidably coupled to said die for axial movement of said first end of said core pin into and out of said cavity via said second opening;

driving means, coupled to said support and said core pin, for rotating and for moving aid core pin into and out of said cavity, said driving means including

a movable member fixedly coupled to said core pin for axial movement therewith and having a first set of threads with a pitch identical to said pitch of said core pin threads,

a stationary member having a second set of threads with a pitch identical to said pitch of said core pin threads and threadedly engaged with said first set of threads, and

power means, coupled to said movable member, for rotating said movable member and said core pin relative to said stationary member and for moving said core pin into and out of said cavity; and

control means, coupled to said support, for limiting axial movement of said core pin into and out of said cavity, said control means including

a forward limit switch and a rearward limit switch, both rigidly coupled to said support,

a forward switch assembly having a first link, pivotally coupled to said support, with a first end and a second end,

said first end of said first link engagable with said movable member and said second end of said first link engagable with said forward limit switch to limit the movement of said core pin relative to said cavity, and

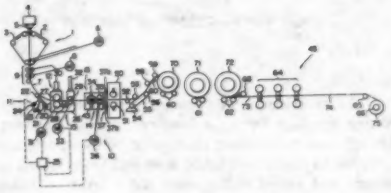
a rearward switch assembly having a second link pivotally couple to said support, with a first end and a second end, said first end of said second link engagable with said movable member and said second end of said second link engagable with said rearward limit switch to limit the movement of said core pin relative to said cavity.

4,958,677

ROLLING INSTALLATION FOR AND ROLLING METHOD OF CONTINUOUS CAST STRIP

Tomoaki Kimura, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 203,108, Jun. 7, 1988, Pat. No. 4,846,254. This application Jul. 7, 1989, Ser. No. 376,648
Claims priority, application Japan, Jun. 11, 1987, 62-146042
The portion of the term of this patent subsequent to Jul. 11, 2006, has been disclaimed.
Int. Cl.[5] B21B *1/46*
U.S. Cl. 164—452 **12 Claims**



1. A method of rolling a continuous cast strip to reduce its width, comprising the steps of:

forming the continuous cast strip by a continuous casting machine;

before cutting the cast strip, delivering the cast strip to a width-reduction rolling mill through a looper arranged between the continuous casting machine and the width-reduction rolling mill, including forming a loop amount of the cast strip with said looper; and

rolling the cast strip to reduce its width while applying a longitudinal tension to the cast strip as it passes through the width-reduction rolling mill by applying a braking force to hold the cast strip on the upstream side of the width-reduction rolling mill and by exerting a driving force on the cast strip on the downstream side of the width-reduction rolling mill.

4,958,678

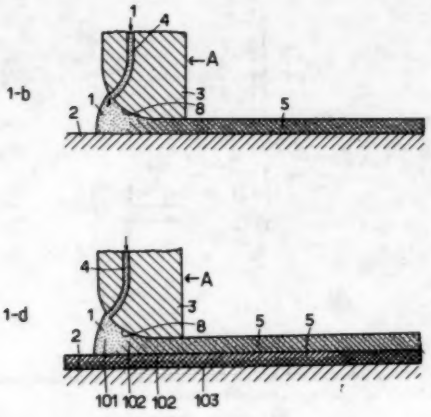
METHOD FOR PRODUCING REINFORCED BLOCK MATERIAL OF METAL OR THE LIKE

Yuzo Kawamura, and Sigeo Nakagawa, both of Otsu, Japan, assignors to Yugenkaisha Idearesearch, Shiga and Matsuo Sangyo Co., Ltd., Osaka, both of, Japan

Filed Dec. 23, 1988, Ser. No. 288,892
Claims priority, application Japan, Dec. 27, 1987, 62-331843
Int. Cl.[5] B22D *11/00*
U.S. Cl. 164—461 **1 Claim**

1. A method for producing a crystalline reinforced block material, wherein a crystalline material in molten state at a high temperature is laminated in thin film form on a base material, and while dissipating heat in the direction of said base material and rapidly cooling said crystalline material, simultaneously applying high pressure and large shearing force to said crystalline material by a pressing means to cool and solidify said crystalline material into a thin film form on said base material to provide an underlying thin layer, and further laminates of said crystalline material in molten state at a high temperature are further laminated in a thin film form on said underlying thin layer surface in molten state or semisolidified state, one film after the other on the immediately proceeding laminated thin layer and while dissipating heat in the direction of said underlying thin layer to rapidly cool the crystalline material, high pressure and large shearing force are simultaneously applied to said crystalline material being laminated to cool and solidify

said crystalline material into a thin film form on said immediately proceeding laminated thin layer to unite, cool and solidify said applied laminate and form a block body of said crystalline material on said base material.



4,958,679

CONDENSER FOR THE WATER-STEAM LOOP OF A POWER PLANT, IN PARTICULAR A NUCLEAR POWER PLANT

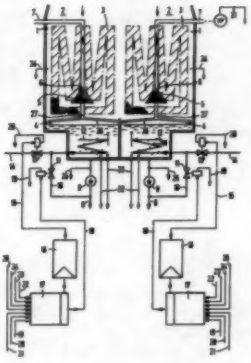
Armin Drosdziok, Essen; Harry Sauer, Eckenhaid, and Walter Zoerner, Baiersdorf-Igelsdorf, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed May 3, 1988, Ser. No. 189,765

Claims priority, application Fed. Rep. of Germany, May 4, 1987, 3714788; May 25, 1987, 3717521

Int. Cl.[5] F28B *11/00*; G01D *5/00*; F22D *1/50*

U.S. Cl. 165—13 **12 Claims**



1. Condenser for the water-steam loop of a power plant, comprising:

a condensate-filled lower portion, a heating pipe system disposed in said lower portion, nozzles disposed on said heating pipe system through which heating condensate or heating steam is forced into the condensate for heating the condensate and thereby expelling dissolved gases from the condensate;

a heating valve connected to said heating pipe system, a proportional regulator connected to said heating valve for adjusting heating output of said heating pipe system through the quantity of hot condensate or hot steam;

a measurement variable converter connected to said proportional regulator and having means for acting upon said proportional regulator at least as a function of oxygen content of the condensate and as a function of subcooling of the condensate, the subcooling being equal to the difference between the temperature of the condensate and the temperature of condensation of steam to be condensed; and

a vacuum pump communicating with said lower portion for removing expelled gases by suction;

said measurement variable converter feeding a measurement result to said proportional regulator causing opening of said heating valve only as long as said vacuum pump is in operation.

4,958,680

APPARATUS FOR PARTICULATE SOLIDS REGENERATION

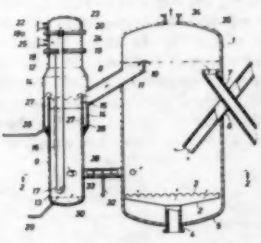
Peter H. Barnes, The Hague, and Johannes L. Nooyen, Amsterdam, both of Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Jun. 30, 1988, Ser. No. 213,750

Claims priority, application United Kingdom, Jul. 9, 1987, 8716160

Int. Cl.[5] B01J *38/30*, *38/32*

U.S. Cl. 165—104.18 **6 Claims**



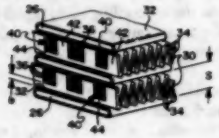
1. Apparatus for particulate solids regeneration which comprises a substantially upright regenerator housing containing fluidization means arranged below spent-solids inlet means and regenerated-solids outlet means and having fluid in- and outlet means, and further comprising at least one external heat exchanger housing connected to the regenerator housing by means of at least two solids outlet tubes for flow of catalyst particles to said regenerator housing and containing heat exchanger means comprising a plurality of tubes with closed lower end parts and open upper end parts mounted in a tube sheet and in communication with the regenerator housing via solids inlet means and said two solids outlet means in which apparatus at least one solids outlet means directly connect a lower section of the heat exchanger housing with a section of the regenerator housing above the fluidization means.

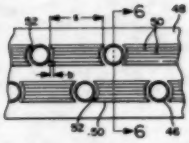
4,958,681

HEAT EXCHANGER WITH BYPASS CHANNEL LOUVERED FINS

Durgaprasad S. Kadle, Getzville, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 14, 1989, Ser. No. 393,157
Int. Cl.[5] F28D *1/04*; F28F *1/32*
U.S. Cl. 165—151 **2 Claims**





1. A heat exchanger having a plurality of round tubes and a plurality of wrap-around multilouver fins between the tubes and thermally coupled to the tubes for enhancing the heat transfer capacity of the heat exchanger, the fins comprising louvers and plain sections, the louvers being placed between pair of tubes and spaced from those on an adjacent fin section and also spaced from the tubes by arcuate plain sections of uniform width serving as arcuate bypass channels of uniform width, the ratio of the width of the arcuate bypass channels to the distance between adjacent tubes having an optimum value, the louvers having the effect of increasing heat transfer and increasing air side pressure drop of the heat exchanger such that the curve of heat transfer versus air side pressure drop increases as the said ratio decreases, the curve having a knee above which a decreasing ratio yields an insignificant increase in heat transfer, the said optimum value of said ratio being at the knee of the curve to thereby optimize the heat transfer property without invoking high air side pressure drop.

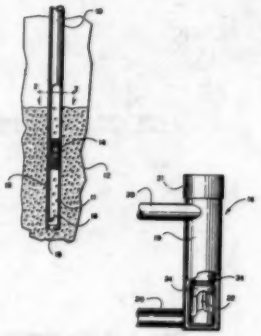
4,958,683

METHOD AND APPARATUS FOR TREATING WELLS

George W. Alford, 1954 Old Daytona Rd., Daytona Beach, Fla. 32014, and William C. Rogers, 1843 Jarrett Dr., Lawrenceville, Ga. 30245

Filed Apr. 11, 1989, Ser. No. 336,087
Int. Cl.[5] E21B *37/08*
U.S. Cl. 166—247 **10 Claims**

1. Apparatus for treating a well, said well including a well casing, and a well screen at the lower end of said casing, the arrangement being that liquid enters said well casing through said well screen, and said liquid is moved up said well casing, said apparatus including a carrier held within said well casing adjacent to said well screen, said carrier including at least one container, said container having a radiation source therein for irradiating said well screen sufficiently to prevent growth of bacteria thereon, and further including means for providing



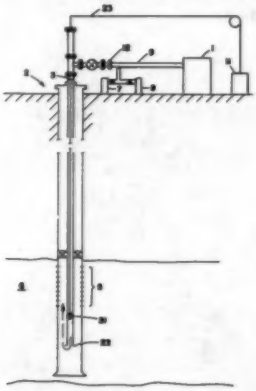
generally free oxygen within said liquid for producing oxygen radicals on irradiation by said radiation source.

4,958,684

STEAM INJECTION PROFILING

Tanh V. Nguyen, Fullerton, Calif.; C. Brent Davenport, Houston, Tex.; Christopher E. Stevens, Lemoore, Calif.; John C. Reis, Yorba Linda, Calif., and Ralph S. Millhone, Brea, Calif., assignors to Chevron Research Company, San Francisco, Calif.

Continuation of Ser. No. 146,770, Jan. 22, 1988, Pat. No. 4,817,713, which is a continuation of Ser. No. 88,465, Aug. 19, 1987, Pat. No. 4,793,414, which is a continuation of Ser. No. 935,662, Nov. 26, 1986, abandoned. This application Mar. 13, 1989, Ser. No. 322,582
The portion of the term of this patent subsequent to Apr. 4, 2006, has been disclaimed.
Int. Cl.[5] E21B *43/24*, *47/00*
U.S. Cl. 166—252 **6 Claims**



1. A method of determining vapor phase stream profiles in a steam injection well comprising the steps of:

a. positioning at least two spaced apart gamma ray detectors in the steam injection well at a first location and a second location including detectors;

b. injecting an irradiated, thermally stable vapor phase tracer into the steam entering the steam injection well;

c. determining a first transmit time with said spaced apart gamma ray detectors;
d. moving the second gamma ray detector to a third location;
e. repeating steps b. and c.; and
f. calculating an amount of vapor entering a formation between said second location and said third location based on said vapor transit times.

3. A method of determining the downhole steam quality at a location in a steam injection well comprising the steps of:
(a) inserting a well logging tool into a steam injection well at a first location, said logging tool further comprising dual gamma ray detectors;
(b) measuring with a mass flow meter a mass flow rate of steam entering the steam injection well;
(c) determining downhole steam pressure at said first location;
(d) injecting an irradiated, thermally stable vapor base tracer into the steam injection well;
(e) determining a vapor transmit time in said steam injection well with said dual gamma ray detectors;
(f) calculating the downhole steam quality at said first location, based upon said mass flow rate and vapor transit time and vapor density at said first location, said vapor density being based upon said downhole steam pressure at said first location.

4,958,685

METHOD FOR PLUGGING LOST CIRCULATION AREAS AND LOST CIRCULATION MATERIAL TO BE USED THEREFOR

Takeshi Hihara, Zushi; Masahide Yanagiya, and Kazuhito Ono, both of Yokosuka, all of Japan, assignors to Toho Kagaku Kogyo Co., Ltd., Japan

Filed May 24, 1989, Ser. No. 356,348
Claims priority, application Japan, May 27, 1988, 63-128186
Int. Cl.[5] E21B *33/138*
U.S. Cl. 166—291 **5 Claims**

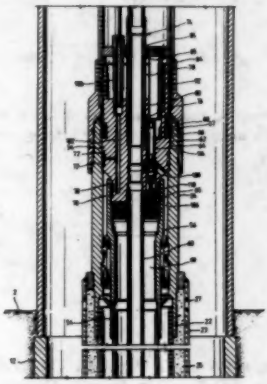
1. A method for plugging the areas of lost circulation occurred during the drilling of a well with the use of a drilling mud circulated through a drilling pipe, which method comprises injecting through the pipe (i) a mineral oil, (ii) a lost circulation material comprising a hydrophilic polyurethane prepolymer and a water-soluble solvent containing no active hydrogen atoms and hardly miscible with the mineral oil, and then (iii) the same mineral oil, so as to allow the urethane prepolymer to come down through the pipe in a manner sandwiched by the mineral oil functioning as a spacer and to penetrate into the lost circulation areas, at which the prepolymer reacts with water and plugs the areas through its polymerization.

4,958,686

SUBSEA WELL COMPLETION SYSTEM AND METHOD OF OPERATION

Samuel W. Putch, Houston, Tex., assignor to Norman A. Nelson, Houston, Tex., a part interest

Filed Aug. 30, 1989, Ser. No. 400,427
Int. Cl.[5] E21B *33/043, 34/14*
U.S. Cl. 166—348 **5 Claims**



1. In a subsea well completion system having at least two casing strings with a casing annulus therebetween, a tubing hanger assembly sealingly engaging said two casing strings and supporting at least one production tubing string, one of the production tubing string forming a tubing annulus with a casing, said tubing hanger including passageways extending from its top through the hanger to one or more of the tubing annulus, the casing annulus, and the sealing engagement of the tubing hanger with the two casing strings, at least one of the passageways includes a vertically extending seal bore at the top and a normally closed check valve for normally preventing upward vertical flow therethrough, said check valve having a stinger extending into the seal bore which, when actuated, opens the check valve, a tree adapter for connection to the tubing hanger assembly and for receiving a valve tree, said tree adapter including a seal sub for engaging said seal bore, said adapter having a side port connected to said sub for externally communicating through the sub to said seal bore the improvement comprising, wherein said sub is slidably supported from the tree adapter and sealably engages the seal bore when the adapter is connected to the tubing hanger and means extending externally of the tree adapter for moving the sub relative to the stinger for opening and closing the check valve.

4,958,687

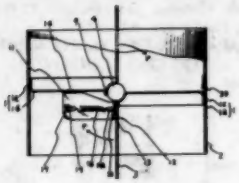
FIRE DAMPER

Katsuyoshi Nakagawa, Osaka, Japan, assignor to Daito Tech Kabushiki Kaisha, Osaka, Japan

Filed Oct. 31, 1989, Ser. No. 429,424
Claims priority, application Japan, Dec. 15, 1988, 63-162944
Int. Cl.[5] F24F *7/00*
U.S. Cl. 169—60 **5 Claims**

1. A fire damper comprising:
a duct;
a flap provided in the duct and supported by the duct in a rotatable manner about an axis crossing the duct and urged elastically in a rotating direction;
a leaf spring an end of which is fixed to the flap;
an engaging member capable of engaging with the leaf spring so as to stop rotation of the flap; and
a heat detecting and actuating element made of form mem-

ory alloy which has an end fixed with the flap and has another end fixed to the leaf spring at a position near a free



end thereof so that the member deforms the leaf spring when the member shrinks under heating.

4,958,688

POWER DRIVEN GOLF HOLE CUTTING APPARATUS

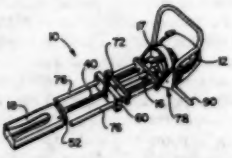
Brett Marrow, P.O. Box 7136, Ancaster, Ontario, Canada L9G 3L4 , and Jim Harris, 1276 Shaver Road, Ancaster, Ontario, Canada (L9G 3L1)

Filed Jun. 20, 1988, Ser. No. 208,591

Claims priority, application Canada, Jun. 29, 1987, 540787

Int. Cl.[5] E21B *12/06*; A01B *45/00*

U.S. Cl. 172—22 **15 Claims**



1. A power driven golf hole cutting apparatus comprising:

(a) an engine;

(b) an elongated shaft having first and second ends and operatively connected at or near said first end to be driven in rotation by said engine;

(c) a cutter head operatively connected to said second end of said shaft whereby said cutter head is driven in rotation by said shaft, said cutter head comprising a somewhat elongated cylindrical member having upper and open lower ends, said lower end having a cutting edge, and wherein the outside diameter of said cylindrical member defines the insides diameter of a hole cut by said apparatus;

(d) plunger means within said cutter head and movable between a first position proximate the top of said cutter head to a second position proximate the bottom thereof, said plunger means comprising a plunger plate which is freely movable axially within said cutter head and control means operatively connected to said plunger plate and extending upwardly from said plunger plate through the upper end of said cutter head; and

(e) power transfer means for selectively transferring the rotation of said shaft to linear motion of said control means to thereby cause said control means to move said plunger means downwardly from said first to said second position.

4,958,689

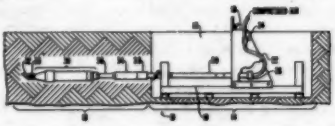
METHOD OF PROVIDING A HIGH PRESSURE SURGE OF WORKING FLUID TO AN UNDERGROUND PERCUSSIVE MOLE

Douglas W. Lee, Enid, Okla., assignor to Gas Research Institute, Chicago, Ill.

Division of Ser. No. 292,243, Dec. 30, 1988. This application Nov. 17, 1989, Ser. No. 437,831

Int. Cl.[5] E21B *4/14*

U.S. Cl. 175—19 **1 Claim**



1. A method of providing a high pressure surge of working fluid to an underground percussive mole connected to a rigid drill string having a downhole end and a surface end, the method comprising the steps of:

connecting a downhole valve between the percussive mole and the downhole end of the drill string;

pulling on the rigid drill string to close the downhole valve;

charging the drill string with working fluid until a desired pressure is reached;

pushing on the rigid drill string to open the downhole valve and release a high pressure surge of working fluid to the percussive mole.

4,958,690

DRILLING DEVICE WITH HYDRAULIC PERCUSSION GENERATOR FOR EARTH DRILLING PURPOSES

Ivan J. Cypbelly, Cadrefin, Switzerland, assignor to Salzgitter Maschinenbau GmbH, Salzgitter, Fed. Rep. of Germany

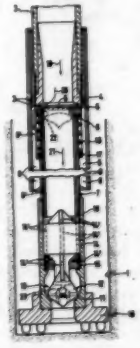
PCT No. PCT/EP88/00085, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06673, PCT Pub. Date Sep. 7, 1988

PCT Filed Feb. 5, 1988, Ser. No. 272,743

Claims priority, application Switzerland, Feb. 25, 1987, 707/87

Int. Cl.[5] E21B *1/00*

U.S. Cl. 175—296 **10 Claims**



1. A drilling device for earth-drilling a borehole and comprising:

a drilling tool;

a percussion generator for applying an oscillating percussion force to said drilling tool; and

a drill pipe extending into the borehole for conducting a

liquid flow thereinto for actuating said generator, said drill pipe having a lower mouth;

said percussion generator including:

a longitudinally movable impulse tube located beneath said drill pipe and having an upper end defining an upper mouth and a lower end, said drilling tool being mounted to said lower end of said impulse tube;

throttle means located between said upper and lower mouths for controlling a ratio of outside and inside portions of said liquid flow flowing on the one hand outside of said impulse tube directly into said borehole and on the other hand inside of said impulse tube in accordance with a longitudinal position of said impulse tube relative to said drill tube;

first spring means for biasing said impulse tube relative to said drill pipe into a position in which said outside portion of said liquid flow is reduced;

a thrust valve arranged at said lower end of said impulse tube for controlling the oscillating percussion force applied to said drilling tool, said thrust valve having a first portion extending into said lower end of said impulse tube and a second portion extending to the borehole outside of said impulse tube, said thrust valve having a first axial length and said impulse tube having a second axial length which is substantially greater than said first axial length of said valve; and

second spring means for biasing said thrust valve to an open position thereof.

4,958,691

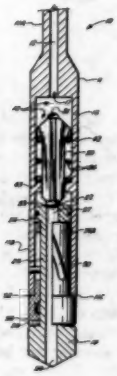
FLUID OPERATED VIBRATORY JAR WITH ROTATING BIT

James Hipp, 110 Lietmeyer St., New Iberia, La. 70560

Filed Jun. 16, 1989, Ser. No. 367,341

Int. Cl.[5] E21B *1/00, 4/14*

U.S. Cl. 175—296 **13 Claims**



1. A well tool for use with an elongated pipe string that can load the tool transmitting impact thereto and with a flow bore for transmitting pressurized fluid to the tool comprising:

(a) a housing having means for connecting said tool in fluid communication with the lower end of a pipe string and defining at least one fluid chamber therein for receiving pressurized fluid transmitted from the pipe string thereto;

(b) tubular stem means having a flow channel therethrough communicating with the fluid chamber, the stem means telescopically received by said housing for relative reciprocal movement therewith between a first "pressured up" unloaded position and a second "impact" loaded position;

(c) an impact receptive working member attached during use to one end of said tubular stem means for movement therewith between said first and second positions, wherein impact is transmitted to the working member in the second impact position;

(d) valve means carried in said housing for controlling the flow of pressurized fluid in the fluid chamber and reciprocally movable therein between first and second positions, said valve means being operable to relieve fluid pressure within the fluid chamber responsive to predetermined movement of said stem means relative to said housing, permitting relative movement of said stem means and housing into said second "impact" position;

(e) biasing means disposed in said chamber, biasing said valve means upwardly into an open flow position when said stem member and housing are in said first unloaded position so that pressurized fluid can flow between the pipe string flow bore and the tubular stem flow channel; and

(f) means interfacing said housing and said stem means for rotating said working member during relative movement of said housing and stem means at least between said first "pressured up" and second "impact" position, including clutch means concentrically positioned between the stem means and the housing and extendable below the housing for rotating the working member in one direction when unloaded by the work string.

4,958,692

DOWNHOLE STABILIZERS

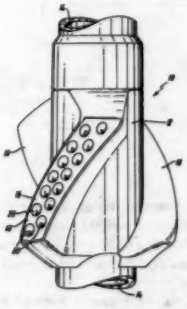
Charles A. Anderson, 78A Stanley Street, Aberdeen AB1 6UQ, Great Britain

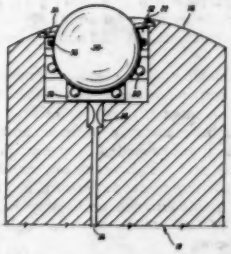
Filed Mar. 14, 1989, Ser. No. 323,575

Claims priority, application United Kingdom, Mar. 15, 1988, 8806109

Int. Cl.[5] E21B *17/10*

U.S. Cl. 175—323 **7 Claims**





1. A downhole stabiliser comprising a generally cylindrical body having a through bore, said body peripherally mounting

a plurality of radially extending blades each also extending along the axial length of the body and having outer edge surfaces defining a periphery of said stabiliser, said blades having gaps therebetween allowing passage of fluid past the exterior of said stabiliser, said stabiliser mounting a plurality of omni-directional rolling-element bearings each individually mounted in a respective pocket on the periphery of the radially extending blades said pockets being distributed in a number of arrays.

4,958,693

ELECTRONIC COUNTING BALANCE

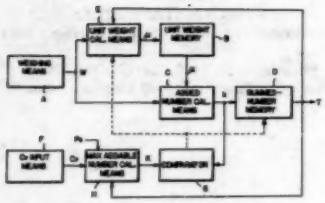
Takatoshi Mursoka, Toyonaka; Nishio Akira, Takatsuki, and Tomohiro Tsuji, Uji, all of Japan, assignors to Shimadzu Corporation, Kyoto, Japan

Filed Jan. 18, 1989, Ser. No. 298,567

Claims priority, application Japan, Jan. 18, 1988, 63-9302; Jan. 18, 1988, 63-9303

Int. Cl.[5] G01G *13/00*

U.S. Cl. 177—25.17 **8 Claims**



1. An electronic counting balance for counting the number of items whose individual weight values are scattered statistically, said electronic counting scale comprising:

a weighing means for measuring a total weight of items loaded thereon;

a unit weight calculating means for calculating an average weight of items loaded on said weighing means;

a unit weight memory for storing said average weight calculated by said unit weight calculating means;

an added number calculating means for calculating the number of items replenished on said weighing means;

a summed number memory for additively storing the number of items calculated by said added number calculating means;

a maximum addable number calculating means for calculating, from a known coefficient-of-variation of item weight and a total number of items additively stored in said summed number memory, a maximum addable number of items which, if not exceeded by the number of items replenished on said weighing means, enables said added number calculating means to perform, at a probability not less than a predetermined probability P_0, an error-free calculation of the number of items replenished on said weighing means;

a comparator for comparing the number of items calculated by said added number calculating means with said maximum addable number of items, said comparator outputting, only when the number of items calculated by said added number calculating means does not exceed said maximum addable number of items, first and second instruction signals respectively to said unit weight calculating means and said summed number memory, said first instruction signal causing said unit weight calculating means to calculate a new average weight of items and to store said new average weight of items in said unit weight memory, and said second instruction signal causing said summed number memory to additively store the number of items calculated by said number calculating means;

whereby the number of items counted by said scale is determined and displayed.

4,958,694

WEIGHING DEVICE

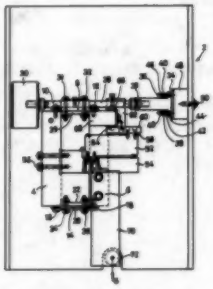
Adrianus J. van den Nieuwelaar, Gemert, and Petrus C. H. Janssen, Wilbertoord, both of Netherlands, assignors to Stork PMT B.V., Netherlands

Filed Dec. 1, 1988, Ser. No. 278,608

Claims priority, application Netherlands, Dec. 1, 1987, 8702888

Int. Cl.[5] G01G *19/00, 19/02*

U.S. Cl. 177—145 **3 Claims**



1. Weighing device for articles which are carried along a transport track in which movement of articles is temporarily interrupted during determination of the weight, comprising a frame, a weight measuring cell carried on the frame, a movable member which is loaded by the weight of the article and positioned to act upon the cell when weight is applied to the movable member, the movable member comprises a tilting arm coupled to a part of the device which is movable and is loaded by the weight to be determined, the tilting arm having a first free end which carries an armature plate transverse thereto, the plate being displaceable outwardly along the tilting arm; and controllable locking means which is selectively operable to draw on the movable member and prevent the member from moving and is freeable to permit the member to move when loaded by weight; the locking means comprising a spring under tension urging the arm inwardly and a cooperating electromagnetic carrier by the frame for drawing the armature plate to displace outwardly.

4,958,695

VARIABLE ASSIST POWER STEERING SYSTEM

Koh Uchida, Sagamihara, and Takashi Karihara, Atsugi, both of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 28, 1987, Ser. No. 138,479

Claims priority, application Japan, Dec. 27, 1986, 61-313518

Int. Cl.[5] B62D *5/83*

U.S. Cl. 180—142 **13 Claims**

12. A variable assist power steering system for vehicles

including a hydraulic fluid source, a fluid reservoir, and a hydraulic pressure operated power cylinder adapted to be connected to a steering linkage, comprising:

a control valve including valve elements relatively displaceable in response to a predetermined variable to define therebetween two parallel fluid flow paths connected between the fluid source and the fluid reservoir to produce a pressure difference in the power cylinder in response to said predetermined variable; wherein

said valve elements define a first pair of main variable flow orifices, one disposed in a first of said two parallel fluid flow paths at an upstream portion between the hydraulic fluid source and the power cylinder and the other in a second of said two parallel fluid flow paths at a downstream portion between the power cylinder and the fluid reservoir, said valve elements also define a second pair of main variable flow orifices, one disposed in said second of said two parallel fluid flow paths at an upstream portion between the hydraulic fluid source and the power cylinder and the other in said first of said two parallel fluid flow paths at a downstream portion between the power cylinder and the fluid reservoir, said first pair of main variable flow orifices having orifice areas which are decreased as said valve elements relatively displace in one direction, said second pair of main variable flow orifices having orifice areas which are decreased as said valve elements relatively displace in an opposite direction; and wherein

said control valve comprises bypass paths, each being connected in parallel to one of said upstream portions of said two parallel fluid flow paths, each bypass path including an auxiliary variable flow orifice that has an orifice area which is variable in response to said predetermined variable and an externally controlled variable flow orifice valve connected in series with said auxiliary variable flow orifice, said externally controlled variable flow orifice having an orifice area which is variable in response to a second predetermined variable which is different from said predetermined variable.

4,958,696

SWITCHING ARRANGEMENT FOR THE HYDRAULIC DRIVE MEANS OF A FULL-TRACK VEHICLE

Karl Lerchbaum, Fohnsdorf, Austria, assignor to Voest-Alpine Maschinenbau Gesellschaft m.b.h., Linz, Austria

Filed Feb. 8, 1989, Ser. No. 307,523

Claims priority, application Austria, Feb. 10, 1988, 286/88

Int. Cl.[5] B62D *11/02*; F15B *11/16*

U.S. Cl. 180—6.7 **3 Claims**

1. A track-laying vehicle, comprising:

a chassis having a longitudinal axis and two laterally opposite sides;

a pair of endless, ground-engaging tracks respectively arranged at said opposite sides of said chassis and operatively supporting said chassis;

a first hydraulically operated motor means carried by said vehicle and operatively associated with one of said tracks, for selectively moving said track in a sense to tend to advance the respective side of said chassis in a forward direction, moving said one track in a sense to tend to advance the respective side of said chassis in a rearward direction, and not moving said one track;

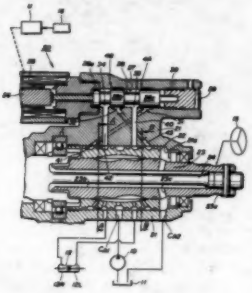
a second hydraulically operated motor means carried by said vehicle and operatively associated with the other of said tracks, for selectively moving said other track in a sense to tend to advance the respective side of said chassis in a forward direction, moving said other track in a sense to tend to advance the respective side of said chassis in a rearward direction, and not moving said other track;

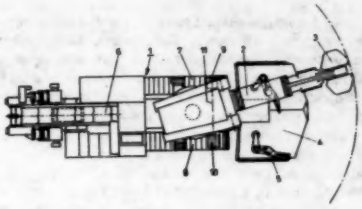
a hydraulic pump having an inlet side, a side connected to a supply of hydraulic fluid, and an outlet side;

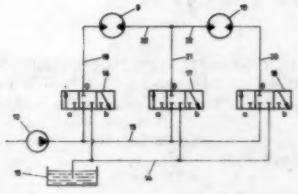
supply conduit means arranged for alternatively connecting said pump in series and in parallel with said outlet side of said hydraulic pump;

a plurality of multi-way valve means incorporated in said conduit means;

return conduit means arranged connecting said multi-way valve means to a sump for spent hydraulic fluid;







said multi-way valve means being arranged to selectively interconnect said hydraulic pump, through said supply conduit means, with said first and second hydraulically operated motor means for selectively alternatively operating said motor means in each of the following modes:

(a) both said motor means are connected in series with one another with said hydraulic pump and rotated in a sense to advance both tracks forward;

(b) both said motor means are connected in series with one another with said hydraulic pump and rotated in a sense to advance both tracks rearward;

(c) both said motor means are connected in parallel with one another with said hydraulic pump and rotated in a sense to advance said one track forward and said other track rearward; and

(d) both said motor means are connected in parallel with one another with said hydraulic pump and rotated in a sense to advance said one track rearward and said other track forward;

said multi-way valve means being further arranged to selectively interconnect said hydraulic pump, through said supply conduit means, with said first and second hydraulically operating motor means such that, when both said motor means are connected in parallel with one another to said hydraulic pump, flow of hydraulic fluid to either of said motor means can be selectively cut-off for moving one but not the other, or the other but not the one track, forward or backward.

4,958,697

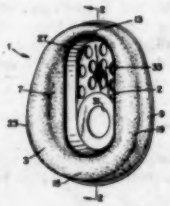
ANATOMICALLY SHAPED EARSEALS FOR HEADSETS

Harold G. Moody, Hopedale, Mass., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Sep. 11, 1989, Ser. No. 405,823

Int. Cl.[5] A42B *3/16*; H04R *25/00*

U.S. Cl. 181—129 2 Claims



1. An anatomically shaped resilient earseal for attachment to headset earcups with nearly flat flanges, said earseal being generally donut-shaped to define an elliptical opening, said earseal having a top, a bottom and an inner facing surface for contacting a head of a wearer of said earseal, said inner facing surface being thinner at said top than at said bottom, and having a variable cross section that creates an inwardly extending profile which matches an anatomical configuration of the head around an ear of the wearer, said elliptical opening containing a diaphragm having a plurality of holes therethrough for permitting externally produced sound to be transmitted through said diaphragm and having an earphone retainer attached about an aperture in said diaphragm.

4,958,698

METHOD FOR STEERING A MOTOR VEHICLE

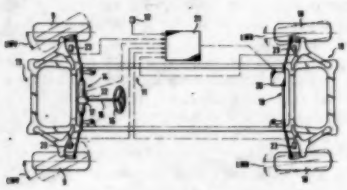
Jochem Kirschner, Bischofsheim, Fed. Rep. of Germany, assignor to General Motors Corporation, Detroit, Mich.

Filed Feb. 27, 1989, Ser. No. 315,675

Claims priority, application Fed. Rep. of Germany, Mar. 10, 1988, 3807842

Int. Cl.[5] B62D *6/00*

U.S. Cl. 180—140 16 Claims



1. In a method of steering a motor vehicle with a conventionally steerable front axle and a steerable rear axle wherein vehicle speed and front wheel steering angle are detected in order to turn rear wheels in dependence on vehicle speed and front wheel steering angle, the improvement comprising the steps of, determining a limit steering angle (LWVgr) corresponding to a fraction of the maximum value of transverse acceleration before slip for the front wheel steering angle (LMV) at a vehicle speed (Vist) above a predetermined minimum vehicle speed (Vo) actually traveled at any given time, continuously comparing the actual front wheel steering angle (LWVist) with the limit steering angle (LWVgr), and turning the rear wheels in the same direction when the actual front wheel steering angle (LWVist) becomes greater than or equal to the limit steering angle (LMWgr).

4,958,699

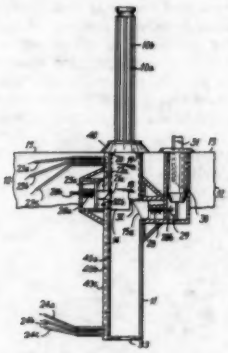
ANTI AUTO THEFT RETRACTABLE POLE

George G. Tchilinguirian, 46-12 218 St., Bayside, N.Y. 11361

Filed Jul. 22, 1988, Ser. No. 192,968

Int. Cl.[5] B60R *25/10*

U.S. Cl. 180—287 20 Claims



1. An anti-theft device for a motor vehicle wherein said motor vehicle has an electrical battery and an ignition electrically connected by ignition wires forming an ignition connection; said anti-theft device comprising a pole member; a housing for said pole member; said housing having a bottom and a cover; said cover defining a pole aperture configured and dimensioned so as to allow at least a portion of said pole member to pass therethrough in reciprocating motion; a portion of said pole member being visible when a portion of said pole member is extending through said pole aperture; an electrical switch means electrically connected to said ignition wires; said electrical switch means having an on position so as to maintain said ignition connection and an off position so as to disconnect said ignition connection and being configured and dimensioned so as to be in said on position when said pole member is resting at the bottom of said housing and to be in said off position when at least a portion of said pole member is protruding through said pole aperture; and a locking means so as to lock said pole member in a position where at least a portion of said pole member is protruding through said pole aperture.

4,958,700

PROTECTIVE FACILITY FOR SUPPRESSING NOISE PRODUCED AT HIGH GAS FLOWS BY ENGINES INSTALLED ON AIRCRAFT

Horst Schafhaupt, Egenhofen, Fed. Rep. of Germany, assignor to Rheinhold & Mahla GmbH, Fed. Rep. of Germany

PCT No. PCT/DE88/00409, § 371 Date Apr. 17, 1989, § 102(e) Date Apr. 17, 1989, PCT Pub. No. WO89/00130, PCT Pub. Date Jan. 12, 1989

PCT Filed Jul. 1, 1988, Ser. No. 331,529

Claims priority, application Fed. Rep. of Germany, Jul. 3, 1987, 3722112

Int. Cl.[5] B64F *1/26*

U.S. Cl. 181—218 3 Claims

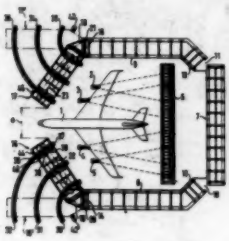
1. Protective means for soundproofing large, high-speed gas flows, especially of aircraft engines, comprising:

sound permeable, directing elements in a form of a mesh lattice erected behind the engines, said elements being obliquely inclined;

an approximately horseshoe-shaped sound absorption wall having two legs, a back, inside and outside faces, said legs each having an end, said wall being approximately twice

as high as said directing elements, said wall located behind said directing elements, said wall being substantially rectangular in cross-section, having front edges located at the end of each the legs; and,

a pair of pivotable gates covered with sound absorption material pivotally attached at said front edges of said



horseshoe-shaped sound absoption wall, said gates being pivotable approximately 60° inward leaving a gap for a nose of an aircraft when completely pivoted inward wherein the gates are movable on a plurality of rails running concentrically about said front edges configured as arcs of a circle about said front edges.

4,958,701

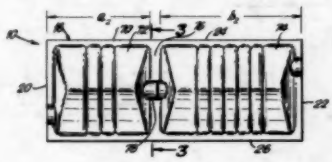
STAMP FORMED MUFFLER WITH POCKET-FREE BAFFLE CREASE

Walter G. Moring, III, Toledo, Ohio, assignor to AP Parts Manufacturing Company, Toledo, Ohio

Filed Mar. 26, 1990, Ser. No. 499,995

Int. Cl.[5] F01N *7/18*

U.S. Cl. 181—282 **14 Claims**



1. An exhaust muffler comprising upper and lower internal plates disposed in face-to-face relationship with one another, each of said internal plates being formed to define an array of channels therein, said channels being disposed to define an array of tubes between said internal plates with said array of tubes defining at least one inlet to the muffler and at least one outlet from the muffler, said upper internal plate including at least one pair of channels disposed in spaced apart end-to-end relationship, said pair of channels being disposed in register with a continuous channel formed in the lower internal plate such that at least one of said tubes of said muffler is defined by the continuous channel of the lower internal plate and the pair of spaced apart channels of the upper internal plate, said muffler further comprising an upper external shell formed to define a peripheral portion and a plurality of chambers extending upwardly from said peripheral portion, said chambers being separated from one another by a baffle crease connecting spaced apart locations on the peripheral portion of said upper external shell, said peripheral portion of said upper external shell being securely connected to at least one of said internal plates such that the chambers thereof surround selected channels of the upper internal plate, said baffle crease being formed to be in face-to-face abutting contact with portions of said upper internal plate, including portions of said upper internal plate disposed between the pair of spaced apart channels thereof, whereby the baffle crease defined in the upper external shell is configured to prevent accumulation of foreign materials.

4,958,702

CONNECTING ARRANGEMENT FOR HORIZONTAL SCAFFOLDING SUPPORTS

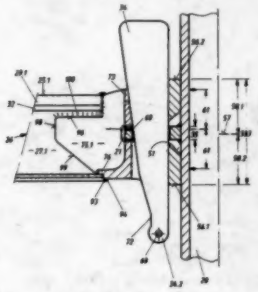
Ruth Langer, Im Weinberg 13, D-7129 Gueglingen (Baden-Wuerttemberg), Fed. Rep. of Germany

Filed Jul. 21, 1989, Ser. No. 382,499

Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824823

Int. Cl.[5] B66B *7/02*

U.S. Cl. 187—95 **5 Claims**



1. A connecting arrangement for horizontally support scaffolding platforms supported by spaced vertically extending support pole means each including a substantially horizontally disposed perforated disk means, and connecting head means for forming a scaffolding support releasably lockable on said perforated disk means, said connecting head means are fashioned of a cast-light metal material and include a connecting area substantially corresponding to an open area of a light metal U-shaped beam means forming a spanning member of the scaffolding, inwardly directed welding flap means are provided along an interior surface of the connecting head means for enabling a formation of a weld seam along a seam edge extending parallel to a supporting edge web means of the U-shaped beam means, said welding flap means being beveled inwardly at one end thereof and being adapted to abut a bottom surface of the U-shaped beam member for forming a reinforcement, a welding and web means provided on an area of the connecting head means abutting a lower horizontal web means of the U-shaped beam means, and disk slot means tapering in an area of an inner base portion thereof so as to have a thickness substantially corresponding to a thickness of the perforated disk means so as to enable the same to be accommodated in the disk slot means, and wherein reinforcing means are provided at least in an area of the disk slot means for reinforcing the connector head means.

4,958,703

SPOT-TYPE DISC BRAKE

Eckard Op Den Camp, Koblenz, Fed. Rep. of Germany, assignor to Lucas Industries public limited company, Birmingham, England

Filed Jul. 10, 1989, Ser. No. 377,445

Claims priority, application Fed. Rep. of Germany, Jul. 15, 1988, 8809123[U]

Int. Cl.[5] F16D *55/224*

U.S. Cl. 188—73.31 **7 Claims**

1. A spot-type brake comprising:

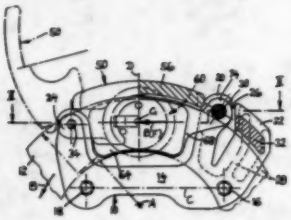
a brake support (10) mounted on a first side of a brake disc

(12) and having a bridge portion (32) extending over said disc to the second side thereof,

first and second brake pads (64, 66) respectively arranged on said first and second sides of said brake disc (12) and supported against the braking forces at said brake support (10),

an actuator (60) which is arranged for direct actuation of said first brake pad (64) onto said first side of said brake disc (12), and

a floating caliper (50) for indirect actuation of said second brake pad (66) onto said second side of said brake disc (12), characterized in that said brake support (10) carries at said first side of said brake disc (12) first and second arms (20, 22) of which



said first arm (20) is of lower rigidity than said second arm (22) and is arranged to sustain the braking forces of said first directly actuated brake pad (64), and

said second arm (22) is of higher rigidity than said first arm (20) and carries said bridge portion (32) and is arranged to sustain the braking forces of said second indirectly actuated brake pad (66),

said two arms (20, 22) being adapted to each other in their relative rigidity so that said first and second brake pads (64, 66) on braking move substantially equal distances in the direction of the braking forces (E, F) due to elastic deformations of said brake.

4,958,704

HYDRAULIC TELESCOPIC SHOCK ABSORBER

Helaz Leiber, Oberriexingen; Walter Klinker, Stuttgart, and Gerhard Meier, Waiblingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 11, 1989, Ser. No. 378,037

Claims priority, application Fed. Rep. of Germany, Jul. 11, 1988, 3823430

Int. Cl.[5] F16F *9/50*

U.S. Cl. 188—285 **13 Claims**

1. A hydraulic telescopic shock absorber comprising:

a cylinder;

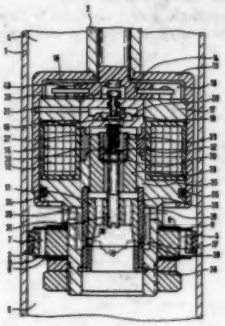
a piston displaceable in said cylinder and retained by a piston rod, said piston dividing said cylinder into two chambers;

channels between said chambers which controllably provide fluid connection between said chambers;

a valve having a slide-type closing element that controls an opening cross-section of the channels;

a differential pressure measuring device between said chambers, said differential pressure measuring device measuring a pressure difference between the two chambers and producing an output signal; and

an electromagnet coupled to the differential pressure measuring device and to said valve, said electromagnet actuat-



ing said valve as a function of the output signal of the differential pressure measuring device.

4,958,705

HYDRAULIC CONTROLLER, ESPECIALLY FOR THE MOVEMENT OF A PROSTHETIC JOINT

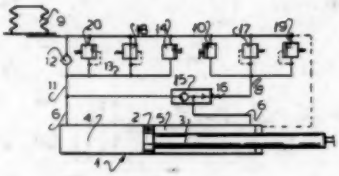
Edward Horvath, Vienna, Austria, assignor to Otto Bock Orthopadische Industrie Besitz-Und Verwaltungs - KG, Duderstadt, Fed. Rep. of Germany

Filed Oct. 28, 1988, Ser. No. 264,213

Claims priority, application Austria, Oct. 30, 1987, 286487

Int. Cl.[5] F16F *9/00*; A61F *2/00*

U.S. Cl. 188—314 **14 Claims**



2. A hydraulic controller, especially for the movement of a prosthetic joint, comprising:

a piston-and-cylinder unit having a cylinder, and a piston displaceable in said cylinder and having a piston rod extending out of one end of said cylinder, said piston defining within said cylinder and on opposite sides of said piston a first cylinder chamber free from said rod and a second cylinder chamber through which said rod extends, said cylinder chambers communicating with one another;

a compensation chamber adapted to receive hydraulic fluid from said first chamber in excess of that required by said second chamber upon displacement of said rod into said cylinder and corresponding to a volume of said rod in said second chamber;

a first check valve communicating between said first chamber and said compensation chamber and oriented to block flow from said first chamber to said compensation chamber but permitting flow from said compensation chamber to said first chamber;

a bypass connected across said first check valve between said first chamber and said compensation chamber and provided with a first throttle element throttling flow of said fluid therebetween;

means forming a passage connecting said second chamber with said compensation chamber and provided with a

further throttle element for throttling flow of said fluid therebetween; and

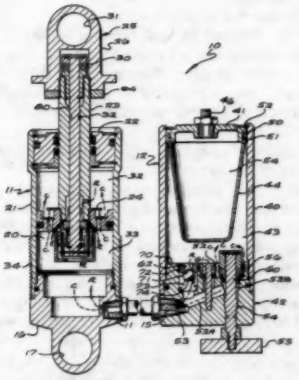
a further check valve connected between at least one of said first and compensation chambers and said second chamber and oriented to block flow of said fluid from said second chamber but permitting flow into said second chamber and filling of said second chamber upon said displacement of said rod, said further check valve being provided in a flow passage communicating between said first and second chambers, said further check valve being a changeover valve having one side connected to said first chamber and to said bypass, an opposite side connected to said further throttle element, and a port between said sides of said changeover valve connected to said second chamber.

4,958,706

ADJUSTABLE SHOCK ABSORBERS

Donald G. Richardson, 16515 Stamp Mill Loop, Jamestown, Calif. 95327, and John G. Cazort, 1902 Clay St., Newport, Calif. 92663

Filed Nov. 14, 1988, Ser. No. 270,010
Int. Cl.[5] F16F *9/34*
U.S. Cl. 188—319 **21 Claims**



1. In a shock absorber including a body defining a cylinder, a piston in the cylinder, a rod for the piston having one end extending out of the cylinder and wherein the shock absorber includes means for securing the body and the end of the piston rod to a vehicle, the improvement in which:

the piston rod is hollow and the shock absorber includes an adjusting rod extending into the hollow portion of said piston rod and said adjusting rod is longitudinally and rotatably movable with respect to said piston rod;

wherein the relative positions of the piston and rod combination control flow through at least one restricted flow path between opposite sides of the piston in the cylinder and

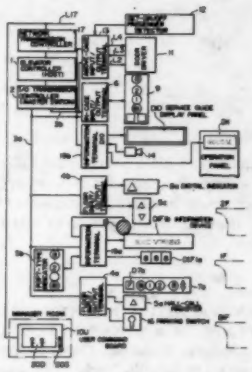
wherein longitudinal relative movement of the adjusting rod with respect to the hollow piston rod makes a first adjustment in the flow in said at least one flow path and relative rotational movement of the adjusting rod with respect to the hollow piston rod makes a second adjustment in the flow in one of the flow paths between opposite sides of the piston.

4,958,707

ELEVATOR CONTROL SYSTEM

Kenzi Yoneda; Toshiki Kajiyama; Kazuhiro Sakata; Mitsuo Munakata, all of Katsuta, and Masato Suzuki, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 29, 1989, Ser. No. 330,376
Claims priority, application Japan, Mar. 30, 1988, 63-74360
Int. Cl.[5] B66B *1/14*
U.S. Cl. 187—101 **15 Claims**



1. An elevator control system comprising an elevator controller for controlling the running of a cage and a plurality of input/output terminal equipments for controlling devices provided at a landing place on each floor and/or in said cage, each of said elevator controller and said plurality of input/output terminal equipments including a transmission controller provided with a transmission circuit and a reception circuit so that said elevator controller and said plurality of input/output terminal equipments are connected to each other through transmission lines, wherein each of said elevator controller and said plurality of input/output terminal equipments is provided with an abnormality detection means for detecting an abnormality and a transmission stopping means for inhibiting transmission through said transmission circuit of its own transmission controller upon detection of occurrence of an abnormality by said abnormality detection means.

4,958,708

DRIVE SYSTEM FOR TURBOCHARGER WITH ROTARY ELECTRIC MACHINE

Hideo Kawamura, Koza, Japan, assignor to Isuzu Motors Limited, Tokyo, Japan

Filed May 24, 1989, Ser. No. 356,231
Claims priority, application Japan, Jun. 10, 1988, 63-143091
Int. Cl.[5] F02B *37/00*; B60K *41/02*
U.S. Cl. 192—0.098 **7 Claims**

1. A system for driving a turbocharger installed in an internal combustion engine and combined with a rotary electric machine, comprising:

a rotary electric machine mounted on a rotatable shaft of the turbocharger;

a generator drivable by an output power of the engine;

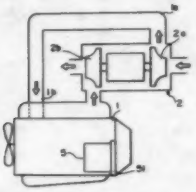
a clutch disposed between said generator and the engine for selectively applying and cutting off the output power of the engine to said generator;

means for driving said rotary electric machine as an electric motor depending on an operating condition of the engine;

means for engaging said clutch to drive said generator when said rotary electric machine is operated as the motor; and

means for supplying electric power generated by said generator to said rotary electric machine,

wherein said generator comprises a DC generator, said means for supplying electric power to said rotary electric means having a voltage converter for increasing the voltage of DC electric power generated by said DC generator, and an inverter for converting the DC electric power with the voltage increased by said voltage converter to AC electric power having a predetermined frequency and supplying the AC electric power to said rotary electric machine.



4,958,709

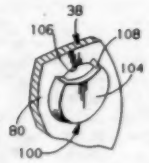
INTEGRALLY FORMED WIPER AND ORIFICE FOR A PUMP PLATE OF A VISCOUS FLUID CLUTCH

Lawrence C. Kennedy, Kettering, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Aug. 25, 1989, Ser. No. 398,590

Int. Cl.[5] F16D *35/02*

U.S. Cl. 192—58 B **1 Claim**



1. A pump plate assembly for separating a pumping chamber and a reservoir of a viscous fluid clutch, wherein the pumping chamber receives fluid from a shear zone, the pump plate assembly comprising:

(a) a plate member of a preselected thickness having a front surface in communication with the reservoir and a rear surface in communication with the pumping chamber;

(b) wiper means integrally formed on the plate member and projecting into the pumping chamber, the wiper means including a ring-like wall terminating in a planar body provided a preselected distance from the rear surface of the plate member, whereby the wall and body define a depression in the plate member having a depth greater than the thickness of the plate member and in fluid communication with the reservoir; and

(c) inlet means formed on the wiper means to provide an orifice for permitting the passage of fluid from the pumping chamber to the reservoir, the inlet means including

(i) an aperture provided in the wall oriented in the direction of oncoming fluid in the pumping chamber thereby providing a planar fluid path from the rear surface of the plate member to the depression formed by the wiper means, and

(ii) a concave arcuate surface in the body and the wall adjacent the aperture for creating a fluid dam in the pumping chamber.

4,958,710

FLUID FRICTION CLUTCH WITH A TEMPERATURE CONTROL

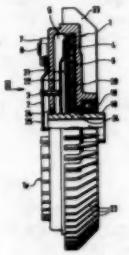
Hans Martin, Stuttgart, and Gerhard Stütz, Renningen, both of Fed. Rep. of Germany, assignors to Suddeutsche Kuhlerfabrik, Fed. Rep. of Germany

Filed Aug. 25, 1989, Ser. No. 398,443

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829322

Int. Cl.[5] F16D *35/02*

U.S. Cl. 192—58 B **17 Claims**



1. A fluid-friction clutch comprising

a housing and a clutch disk within said housing, said housing and said clutch disk serving as input and output elements for the clutch;

a storage chamber in said housing;

a working chamber in said housing separated from said storage chamber by a partition in the housing;

a valve communicating shearing fluid from the storage chamber through the partition to the working chamber;

cooling ribs with projections extending radially inwardly on a side of said housing;

an actuating pin coupled to the valve and controlling the opening of the valve;

a bimetallic strip mounted on said housing and coupled to the actuating pin to control movement of the actuating pin against an elastic force, ends of said bimetallic strip extending under said projections and being held under said projections by the elastic force; and

a shoe with good sliding characteristics that is formfittingly slid on a part of the ribs, the shoe including means interposed between the ends of the bimetallic strip and the projections for allowing relative sliding movement of the bimetallic strip to the projections and for maintaining a separation of the bimetallic strip from the projections.

4,958,711

ROTATIONAL SPEED DIFFERENTIAL RESPONSIVE TYPE JOINT

Takashi Okubo, Zama, and Toji Takemura, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Sep. 30, 1988, Ser. No. 251,175

Claims priority, application Japan, Oct. 2, 1987, 62-151237

Int. Cl.[5] F16D *31/02*

U.S. Cl. 192—60 **16 Claims**

1. A torque transmitting assembly comprising:

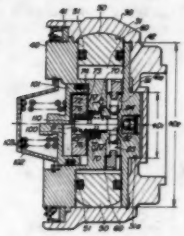
a first rotary member;

a second rotary member disposed in said first rotary member;

hydraulic fluid means for transmitting at least a portion of the input torque from one of said first rotary member and said second rotary member to the other in response to a rotational speed differential occurring between said first and said second rotary members,

said hydraulic fluid means including an internal cam surface

formed on said first rotary member and surrounding said second rotary member, pistons mounted in said second rotary member in slidable direct contact with said cam surface and reciprocable in response to said rotational speed differential to define variable volume chambers in said second rotary member, and means for restricting flow of hydraulic fluid discharge from each of said variable volume chambers on the discharge stroke of the associ-



ated one of said pistons for transmitting torque through said direct contact between said pistons and said cam surface; and

means responsive to a temperature of the hydraulic fluid discharged from variable volume chambers for automatically preventing said rotational speed differential between said first and second rotary members when said temperature of the hydraulic fluid is higher than a predetermined temperature value.

4,958,712

WET CLUTCH DEVICE

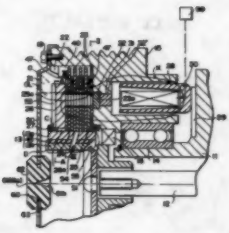
Tatsumi Suganuma; Shigehiro Nozue; Tatsuhiko Fukuoka; Naoto Noguchi, and Akira Takenaka, all of Toyota, Japan, assignors to Taiho Kogyo Co. Ltd., Toyota, Japan

Filed Jun. 28, 1988, Ser. No. 212,682

Claims priority, application Japan, Jun. 29, 1987, 62-163177; Nov. 30, 1987, 62-301938

Int. Cl.[5] F16D *13/72*

U.S. Cl. 192—70.12 **32 Claims**



29. A wet clutch device for selectively transmitting the rotation of a rotatable driving member to a rotatable driven member which is rotatable relative to the driving member, said device comprising an oil chamber which is adapted to enclose a predetermined amount of oil and which is defined by the driving and driven members and a cover which is secured to one of the driving and driven members, said cover having an oil feeding hole through which the oil can be fed in the oil chamber and a plug which is detachably connected to the oil feeding hole of the cover to close the oil chamber, wherein said plug has an air hole which opens when the internal pressure in the oil chamber is above a predetermined value, driving clutch plates which are supported by the driving member so as to move in a predetermined direction in the oil chamber, driven clutch plates which are supported by the driven member so as to move in the same direction as the driving clutch plates in the oil chamber in order to selectively come into engagement with, and disengagement from the corresponding driving clutch plates, and actuating means for bringing the driving clutch plates and the driven clutch plates into engagement with each other.

4,958,713

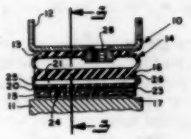
THERMAL BARRIER FOR CLUTCH (BRAKE) ACTUATION ELEMENT (TUBE)

James M. Latsko, North Royalton, Ohio, assignor to Eaton Corporation, Cleveland, Ohio

Filed Jul. 3, 1989, Ser. No. 375,328

Int. Cl.[5] F16D *25/04, 13/10, 69/04*

U.S. Cl. 192—88 B **3 Claims**



1. A fluid expandable coupling comprising an input member, an output member rotatable relative to said input member about an axis of rotation, an annular fluid expandable tube element connected to one of the input and output members, said tube element including an exterior surface which moves radially upon expansion of the tube element to operatively connect said input and output members, a plurality of spaced-apart friction shoes connected to the exterior of said exterior surface of said tube element for radial movement therewith, a drum assembly connected to the other of said input and output members, said friction shoes being movable radially with said exterior surface of said tube element when said tube element is expanded to frictionally engage the drum assembly and operatively connect the input and output members, said friction shoes generating heat upon engagement of said friction shoes with the drum and wherein the coupling includes a thermal barrier to retard the transfer of heat generated by the friction shoes to the tube element, said thermal barrier comprising a fabric layer which retards the transfer of heat from the friction shoes toward the tube element and which adds mechanical strength to the tube element to prevent excess elongation of the tube element and extrusion of the tube element between said spaced-apart adjacent friction shoes when the tube element is expanded, and wherein said fabric has a coefficient of thermal conductivity of approximately

$$\frac{0.3 \text{ BTU} \times \text{in.}}{\text{hr.} \times \text{ft.}^2 \, ^\circ F}$$

or less.

4,958,714

ADJUSTING DEVICE FOR A TWIN-PLATE CLUTCH

Richard D. Cooke, Warwick, and Charles Higginbottom, Leamington Spa, both of United Kingdom, assignors to Automotive Products plc, England

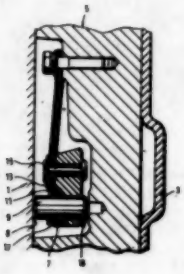
PCT No. PCT/GB87/00802, § 371 Date May 8, 1989, § 102(e) Date May 8, 1989, PCT Pub. No. WO88/03613, PCT Pub. Date May 19, 1988

PCT Filed Nov. 11, 1987, Ser. No. 358,336

Claims priority, application United Kingdom, Nov. 12, 1986, 8627045; Mar. 20, 1987, 8706626; Sep. 9, 1987, 8721156

Int. Cl.[5] F16D *13/75*

U.S. Cl. 192—111 A **13 Claims**



1. An automatic adjusting device for a twin-plate clutch comprising:

a pin (9,39,69,116,139) mounted on an intermediate pressure plate (7,37,67,94,135) of the clutch so as to be slidable along an axis parallel to the axis of rotation of the clutch, the intermediate pressure plate being positioned adjacent to a clutch disc and being operative so as to be selectively frictionally engageable therewith;

first and second abutments provided adjacent to the pin, the first abutment providing a stop for determining adjustment of the pin relative to the intermediate pressure plate and the second abutment providing a stop for determining a disengaged position of the intermediate pressure plate;

a plate (11,43,73,120,144) mounted on the pin by way of an aperture provided in the plate, which aperture is dimensioned such that the plate is tiltable relative to the pin;

a third abutment provided on the intermediate pressure plate and engageable with the tiltable plate, the third abutment defining an axis about which the plate is tiltable; and

a resilient member (17,47,81,122,150,160) urging the tiltable plate in the axial direction of the clutch towards the third abutment so as to cause the plate to tilt and to engage the pin, permitting adjustment of the pin relative to the intermediate pressure plate when the pin is urged against the first abutment and inhibiting movement of the pin relative to the intermediate pressure plate when the pin is urged against the second abutment.

4,958,715

TRANSPORT SYSTEM FOR CURRENCY VALIDATOR

Vladimir Suris, Mayfield Hts., Ohio, assignor to Ardac, Inc. (Dixie-Narco, Inc.), Eastlake, Ohio

Filed Mar. 20, 1989, Ser. No. 325,990

Int. Cl.[5] G07F *7/04*; B07C *5/00*

U.S. Cl. 194—206 **8 Claims**

1. A magnetic reading head system for a currency validator, comprising:

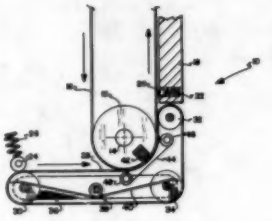
a transport system for moving a note along a note path, said note path being characterized by an area of directional change; and

a magnetic reading head positioned at said area of directional change and adapted for contacting engagement with a not transported therealong;

said transport system comprising:

a pair of first belts in spaced apart parallel relation, each rotatable about one of a pair of first pulley assemblies; and

a pair of second belts in spaced apart parallel relation, each rotatable about one of a pair of second pulley assemblies, a first portion of each of said second belts moving in a generally horizontal direction, a second portion of each of said second belts moving in a generally vertical direction,



said area of directional change being interposed between said first and second portions, respective ones of said first and second belts being in surface contacting engagement with each other at said second portions and area of directional change and adapted for receipt of a note therebetween; and

a third belt interposed between said pairs of first and second belts at said area of directional change, said third belt in contacting engagement with said magnetic reading head and rotatable about a third pulley assembly,

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4,958,716

APPARATUS FOR CONVEYING ARTICLES

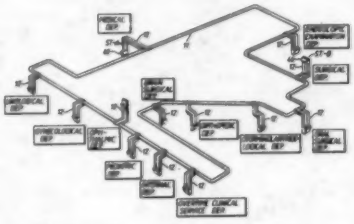
Yukito Matsuo; Tsuyoshi Ishida, both of Yokohama, and Masanori Iwamoto, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Oct. 2, 1987, Ser. No. 103,733

Claims priority, application Japan, Oct. 9, 1986, 61-239158; Oct. 9, 1986, 61-239159

Int. Cl.[5] B65G *47/74*

U.S. Cl. 198—346.1 **45 Claims**



1. An apparatus for conveying reusable carrier cases each said carrier case having a cover and containing articles, said apparatus, comprising:

a main conveyance path;

carrier bodies propelled along said main conveyance path for conveying said carrier cases therein, said carrier cases removably insertable in said carrier bodies;

a first input/output means located along said main conveyance path for receiving carrier cases transferred from said main conveyance path and for supplying carrier cases to

be transferred to said main conveyance path, said carrier cases transferred to and from said carrier bodies;

a second input/output means located along said main conveyance path and spaced from said first input/output means and comprising a carrier case output position for receiving carrier cases transferred from said main conveyance path and a carrier case input position for supplying carrier cases to be transferred to said main conveyance path, said carrier cases transferred to and from said carrier bodies, said main conveyance path coveying carrier cases inserted in said carrier bodies between said first input/output means and said second input/output means; and

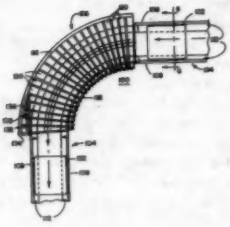
opening means provided near said carrier case output position at said second input/output means for opening the covers of said carrier cases when said covers are closed.

4,958,717

SKID CONVEYOR SYSTEM

John D. Everhart, Veneta, Oreg., assignor to Spectra-Physics, Inc., San Jose, Calif.

Filed Mar. 1, 1989, Ser. No. 317,738
Int. Cl.[5] B65G 47/24
U.S. Cl. 198—416 **7 Claims**



1. A conveyor system for carrying skids supporting products to be assembled along an assembly line including a number of assembly stations, said conveyor system comprising:

straight sections of driven belt conveyors having inlet ends and outlet ends and skid positioning inner and outer rails extending above the surface of the belt conveyors on either side thereof, said rails being spaced to receive said skids therebetween to position said skids across said belt conveyors; and

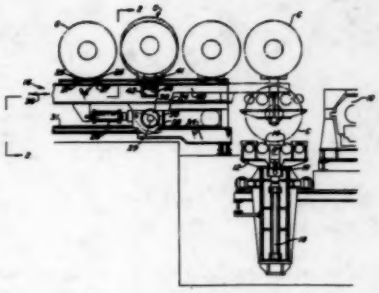
arcuate sections of driven roller conveyors having inlet ends and outlet ends and a skid retaining rail extending above the surface of said roller conveyors on the outer side thereof for preventing skids from falling from said roller conveyors, said roller conveyors being positioned between sections of said belt conveyors to couple sections of said belt conveyors which are angularly oriented relative to one another, being wider than said belt conveyors to accommodate rotation of said skids as they are carried around said roller conveyors and comprising skid orienting means positioned adjacent said outlet ends of said roller conveyors, said skid orienting means comprising a partial chord member extending from the skid retaining rail of said arcuate roller conveyor to a point adjacent and substantially aligned with the outer rail of the inlet end of a straight belt conveyor section to which skids are to be passed for squaring said kids relative to said belt conveyors whereby skids carried along said conveyor system are smoothly conveyed from said arcuate roller conveyors to said straight belt conveyors in spite of angular misorientation of said skids along said arcuate roller conveyors which misorientation would otherwise cause jamming of said skids upon attempted entry into said straight belt conveyors.

4,958,718

ARTICLE CENTERING DEVICE

Winfried F. Schmiedberg, Pittsburgh, Pa., assignor to SMS Engineering Incorporated, Pittsburgh, Pa.

Filed Jul. 12, 1989, Ser. No. 378,694
Int. Cl.[5] B65G 47/26
U.S. Cl. 198—456 **11 Claims**



1. The combination of a walking beam conveyor and a workpiece measuring and centering device,

the conveyor including cooperative stationary and moveable workpiece supporting means,

means for raising, lowering and longitudinally moving said moveable walking beam supporting means relative to said stationary supporting means such that in one position said moveable supporting means falls below a workpiece supported by said stationary supporting means and in a second position above said stationary supporting means, whereby in the latter case the workpiece is lifted off said stationary supporting means, said longitudinal movement being in a given path of travel,

said moveable workpiece supporting means having an opening arranged transverse of said path of travel,

the device including a workpiece supporting means constructed and arranged to pass into said opening from one side of the conveyor when said moveable walking beam supporting means is in said second position, and for receiving and supporting a workpiece from said moveable walking beam supporting means,

the device including a workpiece measuring means arranged so that when the device is traversed into said opening with a workpiece carried by said moveable walking beam supporting means a measurement is made of a selected portion of the workpiece,

means for moving the workpiece supporting means of the device to and from the conveyor, and

control means for determining from said measurement any off center condition of said workpiece relative to a given data position and for effecting an operation of said means for moving said supporting means of the device to center said workpiece when the workpiece is transferred from said moveable walking beam supporting means to said supporting means of the device.

4,958,719

APPARATUS FOR SCRAPING SOLID MATERIALS FROM A CONVEYOR SURFACE

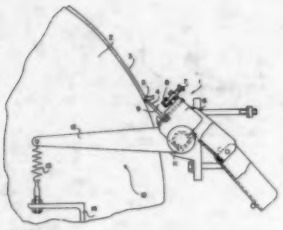
Roland Hourticolon, Leichlingen, and Hermann Kloettschen, Duesseldorf, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Aug. 26, 1988, Ser. No. 237,267

Claims priority, application Fed. Rep. of Germany, Aug. 27, 1987, 3728580

Int. Cl.[5] B65G *45/00*

U.S. Cl. 198—635 3 Claims



1. An apparatus for scraping removable solid materials from a wide conveyor surface, comprising an elongate blade holder member, a plurality of individual blades having scraping edges, means for engaging said blades in alignment within said holder member to provide a segmented elongate scraping blade edge for engagement with the wide conveyor surface, said blade holder member having an edge formed therein to enable rotatably or pivotally engaging the individual blades therewithin, and individual adjustable compression means attached to said blade holder member for adjustably fastening the individual blades within the blade holder member in a rotated or pivoted position and provide an elongate segmented blade edge, said adjustable compression means comprising at least one adjustable screw and flexible member for each of the individual blades, each said screw threadably engaging the blade holder member and with the flexible member applying a compressive force against a said individual blade to fasten said blade within the holder, whereby the blade edge segments are individually and independently adjustable to conform to conveyor surface irregularities.

4,958,720

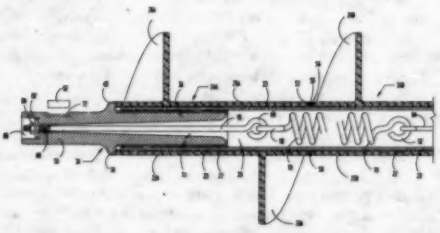
SCREW CONVEYOR COUPLING APPARATUS

James M. Lapeyre, New Orleans; Peter G. Weber, LaPlace, and Christopher G. Greve, Covington, all of La., assignors to The Laitram Corporation, Harahan, La.

Division of Ser. No. 332,392, Apr. 3, 1989, which is a continuation of Ser. No. 58,393, Jun. 5, 1987, abandoned. This application May 22, 1989, Ser. No. 354,803

Int. Cl.[5] B65G *33/32*

U.S. Cl. 198—666 7 Claims



1. Screw conveying apparatus including a modular screw conveyor having a multiplicity of integrally formed modules, said modular screw conveyor also including a combination axial member extending a selected length, and a flight member helically encircling more than 360° of said combination axial member and extending said selective length, said apparatus comprising:

at least two substantially similar integrally molded plastic modules, each module including an elongated axial member extending between a pair of ends and defining an aperture having a cross-section of a first non-circular shape extending coaxially therethrough, each module further including a flight member which helically encircles not more than 360° of said axial member and extends between said pair of ends, at least one end of one of said at least two modules formed to cooperate with an adjacent end of the other one of said at least two modules;

said multiplicity of modules being aligned coaxially such that, except for modules on the extreme ends, each end of each module is in axial confronting relationship with an end of an adjacent module and such that said aperture of each of said multiplicity is in register with the aperture of an adjacent module so as to define a modular screw conveyor having an elongated aperture of a non-circular cross-section extending said selected length and including a flight member which encircles more than 360° of said combination axial member and substantially extends the length of said aligned modules;

an elongated drive shaft having a perimeter cross-section of a second non-circular shape extending axially through and cooperating with the in-register apertures of said aligned multiplicity of modules such that rotation of said drive shaft causes rotation of said screw conveyor, said drive shaft further including an aperture extending coaxially from at least one end of, and into said drive shaft, said aperture in said drive shaft being smaller than said perimeter cross-section and having a cross-section of a third non-circular shape;

a journal plug having a mounting end and a drive end and defining an aperture extending axially therethrough, said mounting end of said journal plug defining a size and shape such that rotation of said journal plug causes rotation of said drive shaft;

an attaching means having a first portion connected to said journal plug and a second portion extending coaxially within said aperture of said journal plug; and

tension means attached to said second portion for applying an axial force to said attaching means in a direction so as to resiliently maintain said journal plug within said aperture of said drive shaft.

4,958,721

INCLINED BUCKET ELEVATOR

Chris R. Redford, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

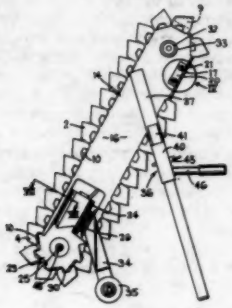
Filed Jun. 24, 1988, Ser. No. 211,360

Int. Cl.[5] B65G *17/36*

U.S. Cl. 198—710 13 Claims

1. A bucket elevator comprising: a stationary guide track defining an endless path; a series of movable buckets slidably mounted on said track for movement through said path, each bucket being free from fixed mechanical connection to the

other buckets and said track and having a slot provided with two lip members which slidably engage said guide track; and



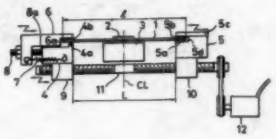
drive means drivingly engageable with said buckets for moving said buckets in series through said path.

4,958,722

TRANSFER APPARATUS FOR LEAD FRAME

Hiroaki Kobayashi, Yokohama, and Kenji Hashimoto, Kawasaki, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 25, 1989, Ser. No. 398,505
Claims priority, application Japan, Aug. 25, 1988, 63-211422
Int. Cl.[5] B65G *19/28*
U.S. Cl. 198—735.3 **6 Claims**



1. A transfer apparatus for a lead frame, the lead frame having side edges, the transfer apparatus comprising:

a pair of parallel guide means for engaging with a lead frame and for supporting it;

driving means for moving at least one of said guide means toward and away from the other guide means in the widthwise direction of the lead frame; and

transfer means for transferring said lead frame to a longitudinal direction thereof;

at least one of said guide means having a first guide rail which is driven by said driving means in the widthwise direction of said lead frame and a second guide rail which is movable in the widthwise direction of said lead frame so as to change the position to said second guide rail with respect to said first guide rail, and having biasing means for biasing said second guide rail toward said first guide rail;

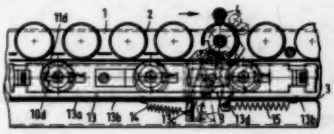
said driving means comprising a driving unit for driving said first guide rail, memory means for previously storing therein the data regarding the width of said lead frame, and a control unit for controlling said driving unit in response to said data, whereby said lead frame is transferred in the longitudinal direction while maintaining a predetermined gap between each of the side edges of said lead frame and each of said guide means and, furthermore, one of said guide means is driven by said driving means to move toward or away from the other guide means so that a plurality of types of lead frames having different widths can be transferred.

4,958,723

ROLLER TRACK

Edgar Bonifer, Muenster; Walter Duttine, Offenbach, and Hartwig Reckemeier, Maintal, all of Fed. Rep. of Germany, assignors to Mannesmann AG, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 777,034, Sep. 17, 1985, abandoned. This application Feb. 22, 1989, Ser. No. 315,336
Claims priority, application Fed. Rep. of Germany, Sep. 17, 1984, 3434092; Jun. 21, 1985, 3522177
Int. Cl.[5] B65G *13/06*
U.S. Cl. 198—781 **24 Claims**



1. Roller track arranged in sections in that individual groups of carrier rollers can be selectively drivingly connected to and disconnected from a drive belt for section by section stop-and-go operation permitting a buffer storage location for each section, there being vertically displaceable belt rollers for engaging the belt to obtain driving connection to and disconnection from carrier rollers, the improvement comprising:

a plurality of control rollers each having oppositely situated peripheral openings and mounted for undergoing turning motion;

means for respectively mounting eccentrically the belt rollers in the control rollers so that depending upon the angular position of the control rollers on account of any turning motion the respective belt rollers are lifted or lowered for engagement with or disengagement from the belt;

a plurality of control bars arranged pairwise in operatively overlapping relation such that respective two of the bars function to disengage the belt from each roller track section;

control cams respectively coupled to the control rollers and being in engagement with at least one control bar for triggering turning of the control roller to change the disposition of respective control roller to temporarily engage the belt so that the belt turns the control roller over a particular angle and turns it into a position in which the belt roller therein and the belt are lowered away from the carrier rollers;

an actuator bar for each roller section and being coupled to one of said control bars which extends also into the respective adjacent upstream section, so that the actuator bar as well as an adjacent upstream actuator bar, upon being turned down by loads, cause said one control bar to initiate turning of the control rollers such that the respective belt roller and the belt therein disengage from the carrier rollers of the respective section, the belt provides for said turning of the control roller by frictional engagement so that the belt itself will disengage from the carrier rollers of the buffer station and the carrier rollers of said section;

spring means connected to the control bars to obtain control operations of one section in response to an operating state of the respective next downstream section so that the load on the carrier rollers of said one section can be stopped if there is a load on that next downstream station; and

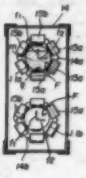
brake means actuated by the control rollers in response to disengagement of the belt from the carrier rollers to stop the carrier rolls.

4,958,724

TUBULAR BELT CONVEYOR

Kunio Hashimoto, Kitakyushu, Japan, assignor to Kabushiki Kaisha Nihon Pipe Conveyor, Kitakyushu, Japan

Filed May 23, 1989, Ser. No. 355,662
Claims priority, application Japan, May 24, 1988, 63-124991
Int. Cl.[5] B65G 15/08
U.S. Cl. 198—819 8 Claims



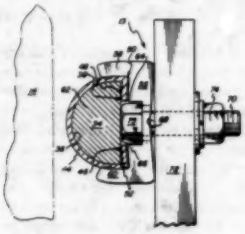
1. In a tubular belt conveyor having an endless belt and a plurality of supporting frame mounted at predetermined intervals along the length of the endless belt for guiding the endless belt along a prescribed path having changes of direction, each of the supporting frames being provided in the upper and lower portions thereof with an upper belt passageway and a lower belt passageway respectively, and with a plurality of smooth belt-retaining rollers circumferentially disposed around each of the belt passageways to allow the endless belt to roll up into a tube to wrap and convey a loaded material; the improvement comprising at least one supporting frame positioned along the path at a change of direction thereof having at least one grooved friction roller disposed at that circumferential position which takes a greater load resulting from the change in direction and the weight of the materials being conveyed than do the other belt retaining rollers within the supporting frame, whereby said grooved roller is located at a position other than the lowermost support position.

4,958,725

CONVEYOR GUIDE RAILING ASSEMBLY

Alan J. Meade, Lynchburg, and Paul W. Smith, Forest, both of Va., assignors to Simplimatic Engineering Company, Lynchburg, Va.

Filed Sep. 12, 1988, Ser. No. 243,434
Int. Cl.[5] B65G 15/00
U.S. Cl. 198—836.1 10 Claims



1. An improved guide railing assembly for a conveyor system, said assembly comprising:

(a) an elongated railing for providing lateral support to articles being conveyed along a path defined by said conveyor, said railing having a curved surface for facing towards said path, said railing further having a relatively flat surface for facing away from said path, said curved surface joining said flat surface along two junctions extending parallel to said path, said railing having a substantially half-moon shaped cross-section; and

(b) a generally U-shaped clamp having a pair of gripping fingers corresponding to the legs of said U, said fingers being curved toward each other in a shape substantially corresponding to the curvature of said curved surface, said fingers being spaced apart a sufficient distance to receive therebetween at least said railing, the bottom portion of said U being generally concave and forming an aperture therethrough for receiving means for fastening said clamp to a support member associated with said conveyor, said clamp being spring-like to respond to a tightening of said fastening means by tending to flatten the bottom of said U and force said fingers towards each other in a gripping fashion on a portion of said curved surface of said railing therein,

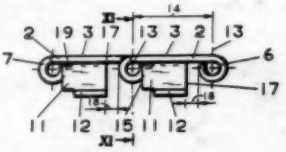
whereby said railing can be reliably retained by said clamp in a preselected position relative to said conveyor path.

4,958,726

CURVED APRON CONVEYOR

Jürgen Fett, Atzelgift; Karl G. Oelschläger, Hagen, and Wolfgang Bannert, Friindesberg-Dellwig, all of Fed. Rep. of Germany, assignors to Rexnord Kette GmbH & Co. KG, Fed. Rep. of Germany

Filed Apr. 4, 1989, Ser. No. 333,429
Claims priority, application Fed. Rep. of Germany, May 28, 1988, 3818231
Int. Cl.[5] B65G 17/06
U.S. Cl. 198—852 9 Claims



1. A curved apron conveyor comprising a plurality of plate members, engaging with one another at their neighbouring side edges with hinge eyes, connected to one another by means of hinge pins and having guiding surfaces that cooperate with guide rails, wherein said guiding surfaces that cooperate with guide rails, wherein said guiding surfaces are arranged off-center of said plate members in relation to the conveying direction, said guiding surfaces each having a front edge and a rear edge, said hinge eyes comprising a double front hinge eye and a single rear hinge eye, said front edge contacting said double front hinge eye so as to provide additional lateral stability of the guiding surface relative to the front hinge eye, and said rear edge, spaced from said rear hinge eye, forming an open space therebetween so that said conveyor has a self-cleaning effect.

4,958,727

SHOWCASE FOR STORING AND DISPLAYING POST-TYPE EARRINGS

Margaret A. Bergeron, 12298 Sawgrass Ct., West Palm Beach, Fla. 33414

Filed Sep. 11, 1989, Ser. No. 405,240
Int. Cl.[5] B65D 75/30, 85/30
U.S. Cl. 206—6.1 5 Claims

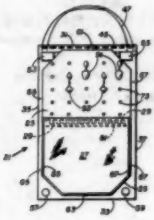
1. A hangable showcase for displaying large, dangly post-type earrings, comprising:

a flexible rectangular cover sheet having a top cover sheet edge and a bottom cover sheet edge defining a cover length therebetween; side cover sheet edges defining a cover sheet width therebetween, said cover sheet having a cover sheet fold therein about half way between and

substantially parallel to said top and bottom cover sheet edges;

a flexible, substantially-rectangular perforated mounting sheet adapted for receiving and holding the posts of said post-type earrings, said mounting sheet having a top mounting sheet edge and a bottom mounting sheet edge defining a mounting sheet length, and side mounting sheet edges defining a mounting sheet width therebetween, said mounting sheet having a mounting sheet fold therein about half way between and substantially parallel to said top and bottom mounting sheet edges;

a flexible, substantially rectangular spacer sheet having a top spacer sheet edge and a bottom spacer sheet edge defining a spacer sheet length therebetween; and side spacer sheet edges defining a spacer sheet width therebetween, said spacer sheet having a spacer sheet fold therein adjacent to said top spacer sheet edge and substantially parallel to said top and bottom spacer sheet edges;



said mounting sheet fold being superimposed on said cover sheet fold and said spacer sheet fold being superimposed on said mounting sheet fold, said cover sheet, mounting sheet and spacer sheet being permanently attached along said superimposed folds;

a first hook-and-loop closure pair attached in opposed positions to said mounting sheet across the width thereof adjacent to said top mounting sheet edge, and to said cover sheet across the width thereof adjacent to said top cover sheet edge;

a second hook-and-loop closure pair attached in opposed positions to said cover sheet adjacent to said top and bottom cover sheet edges and adjacent to one of said cover sheet sides;

a third hook-and-loop closure pair attached in opposed positions to said cover sheet adjacent to said top and bottom cover sheet edges and adjacent to the other of said cover sheet sides.

4,958,728

FILING SYSTEM

Darwin Effendi, 8605 Saffron Place, Burnaby, B.C., Canada V5A 4H8

Filed Oct. 2, 1989, Ser. No. 415,606

Int. Cl.[5] B65D *5/44*

U.S. Cl. 206—44 B **16 Claims**

1. An apparatus for filing documents, comprising:

a box-like container having opposite sides, opposite ends, a top opening and a bottom;

a cover for the container which removably closes the said top opening;

an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when in an expanded condition; and

releasably connecting means for releasably connecting the file folder to the ends of the container, the said ends being spaced apart at a fixed distance which is sufficient to maintain the folder in the expanded condition within the container.

13. An apparatus for filing documents, comprising:

a box-like container having opposite sides, opposite ends, a top opening and a bottom;

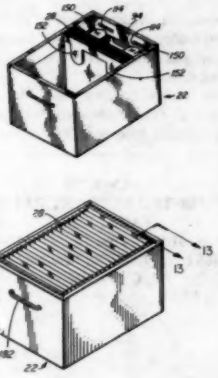
a cover for the container which removably closes the said top opening, the cover being rectangular and having sides and ends; and

an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when expanded;

releasable connecting means for releasably connecting the file folder to the ends of the container to maintain the folder in the expanded condition within the container, and

the apparatus having a knocked-down condition wherein the container is folded, the file folder is collapsed, and the folded container and collapsed folder are removably received within the cover.

15. An apparatus for filing documents, comprising:



a box-like container having opposite sides, opposite ends, a top openings and a bottom;

a cover for the container which removably closes the said top opening;

an expandable file folder having a plurality of divisions and being of a size which fully occupies the interior of the container and extends from one end of the container to another end thereof when expanded; and

releasable connecting means for releasably connecting the file folder to the ends of the container to maintain the folder in the expanded condition within the container;

the releasable connecting means including each end of the container having at least one elongated horizontal slot located adjacent an upper portion of the respective end, and the expandable file folder has a rectangular end panel at each end thereof, the end panel having at least one elongated downwardly extending tab located adjacent an upper portion thereof and adapted to fit within the elongated slot.

4,958,729

BALL GLOVE CONDITIONING BAG

Robert L. Wright, Des Moines, Iowa, assignor to Creative Athletic Products & Services, Inc., Des Moines, Iowa

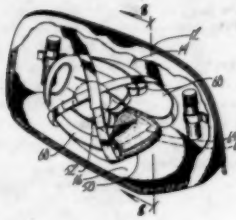
Continuation-in-part of Ser. No. 371,748, Jun. 27, 1989, Pat. No. 4,883,170. This application Nov. 27, 1989, Ser. No. 441,878

Int. Cl.[5] B65D *85/18, 81/22*

U.S. Cl. 206—315.1 **9 Claims**

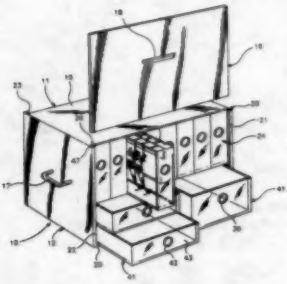
1. A ball glove and glove conditioning bag comprising,

a bag having a chamber defined by a bottom wall and side walls,
and an access opening into said bag,
a ball glove in said chamber,
fastening means in said bag for holding said glove stationary and substantially centered between said side walls,
a conditioning fluid applicator in the pocket of said glove,



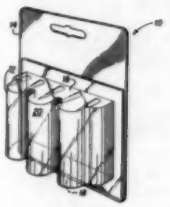
said applicator, including a tube of conditioning fluid absorbent material, said tube having an open end and a closed end and said a ball is disposed in said closed end of said tube, and
said fastening means holding said glove in a wrapped-around-said-ball relationship whereby conditioning fluid may be transferred from said applicator to said glove.

4,958,730
COMPARTMENTED SUPPORTED FISHING LURE TACKLE BOX
Arthur L. Bunten, 6103 Horton Dr., La Mesa, Calif. 92042
Filed Mar. 12, 1990, Ser. No. 491,950
Int. Cl.[5] A01K *97/06*
U.S. Cl. 206—315.110 **9 Claims**



1. A tackle box comprising:
a. an enclosure having two opposing side panels and a rear panel, a removable front panel opposite the rear panel, a bottom panel and a top panel opposite the bottom panel;
b. a first front panel retaining means on a front of the enclosure to retain the front panel in place over a front opening of the enclosure;
c. a plurality of lure storage drawers slidingly disposed within the enclosure;
d. the lure storage drawers comprising a first side section and a second side section parallel to and diametrically opposing each other, and having both side sections attached to a top section and a bottom section, parallel to the top section, to form a rectangular lure enclosure;
e. a first drawer pull means in the second side section of the lure storage drawers to facilitate slidable movement of the lure storage drawers;
f. a longitudinal slot in an upper surface of the top section having lateral slots extending therefrom;
g. lateral slits through the top section connected to the lateral slots;
h. a retainer support in the longitudinal slot;
i. a plurality of elastic retainers with one end attached to the retainer support and placed in the lateral slots and having a length longer than the lateral slots;
j. the elastic retainers passing down through the lateral slits into the rectangular lure enclosure;
k. an attachment means on an end of the elastic retainers to attach a lure; and
l. a lure holding bar parallel to the bottom section of the lure storage drawer and with one end of the lure holding bar attached to the first side section and the other end attached to the second side section and traversing a distance between the first and second side section of the lure storage drawer.

4,958,731
BATTERY PACKAGE
Victor A. Calcerano, Carmel, N.Y., assignor to Duracell Inc., Bethel, Conn.
Filed Nov. 22, 1989, Ser. No. 440,144
Int. Cl.[5] B65D *73/00*
U.S. Cl. 206—333 **14 Claims**

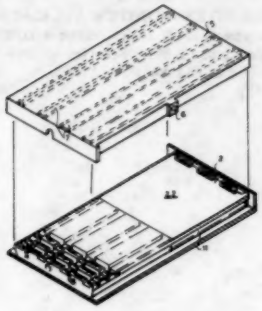


1. A package for the sale and display of a plurality of cylindrical objects in at least two rows, one behind the other; wherein the first, front row has fewer objects than the next row; said package comprising a blister having a top, a bottom, and a contoured portion between said top and said bottom; and wherein said blister has an open back for loading said cylindrical objects into the blister; said contoured portion of the blister being shaped to receive a first row of objects in which none of the objects touch each other, and said contoured portion including means to prevent nesting between the objects in the first row objects being loaded into said next row.

4,958,732
SLIDE-TOP DRILL-BIT STORAGE BOX
Georg Rau, Giengen-Hohenbemmingen, and Günter H. Budert, Bachhagel, both of Fed. Rep. of Germany, assignors to Firma Georg Knoblauch, Giengen/Brenz, Fed. Rep. of Germany
Filed Nov. 16, 1989, Ser. No. 437,827
Claims priority, application Fed. Rep. of Germany, Nov. 26, 1988, 3839993; European Pat. Off., May 12, 1989, 89108568.0
Int. Cl.[5] B65D *85/24*
U.S. Cl. 206—379 **11 Claims**

1. A storage case for elongated objects, the case comprising:
a generally flat base part formed with an array of parallel and longitudinally extending grooves separated by longitudinally extending ridges, the grooves all being open longitudinally at one end and closed longitudinally at the opposite end, whereby the objects can be held in the grooves; and
a generally flat cover part engaged over the base part and covering the grooves, the cover part having one transversely extending edge lip overreaching the open ends of

the grooves and formed with a longitudinally throughgoing aperture of generally the same transverse width as the grooves, the cover part being slidable transversely along the base part for alignment of the aperture with the open



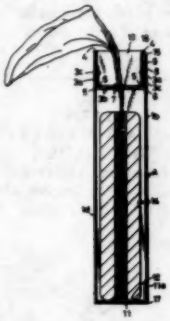
end of each of the grooves, one of the parts being formed with a transversely extending notch formation open toward the other part and the other part being formed with a transversely extending rib formation generally complementary to and fitting into the notch formation.

4,958,733

CONTAINER FOR ACCOMMODATING STRING-LIKE ARTICLES AND TAKING OUT THE SAME

Yoshiji Masuda, Osaka, Japan, assignor to Eiwa Industry Co., Ltd., Osaka, Japan

Filed Jan. 19, 1990, Ser. No. 467,249
Claims priority, application Japan, Jan. 20, 1989, 1-5314
Int. Cl.[5] B65D *85/67*
U.S. Cl. 206—409 **5 Claims**



1. A container for accommodating string-like articles and taking-out the same comprising;

a polygonal cylinder having a bottom plate which is formed by bending one extended portion of one side of the cylinder normal to the side of the cylinder and fastening the same by inserting the end thereof in the cylinder;

the first cover plate which is formed by folding flat a flap extending from the upper end of one side opposite to the bottom plate inside the cylinder, bending normal to the side to reach the opposite side and bending again upward along said side;

the second cover plate which is formed by folding flat another flap extending from the upper end of another side opposite to the first side inside the cylinder, bending normal to the side to reach the first side and bending again upward along said side;

whereby the first and the second cover plates overlap each other in such a manner as the upper cover plate avoids the lower cover plate from opening upward;

a slit provided on the upper edge of the cylinder;

a cutter mounted at the bottom of the slit; and

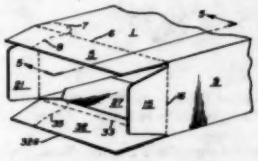
two holes provided at the center of each cover plate, through which the string-like articles is drawn out from the roll thereof accommodated in the chamber formed by the bottom plate and the cover plate.

4,958,734

END LOADED CARTON HAVING A TRIPLE PLY WALL

Prentice J. Wood, Hapeville, and Rodney K. Calvert, Dunwoody, both of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed Oct. 10, 1989, Ser. No. 419,319
Int. Cl.[5] B65D *71/06*
U.S. Cl. 206—435 **5 Claims**



1. An end loaded carton for packaging a plurality of cans arranged in side by side relation, said carton comprising foldably joined top, bottom and side walls forming a tubular structure and having end closure panels, one wall of the carton being of double ply construction having inner and outer panels and being in engagement with the ends of the packaged cans, the inner ply of said one wall including a thickening panel foldably joined to an end edge of said inner ply which is spaced inwardly from the adjacent end edge of said outer ply, said thickening panel being folded into flat face contacting relation with said inner ply to form a three ply wall in engagement with the can ends.

4. An end loaded carton for packaging a plurality of cans arranged in side by side relation, said carton comprising foldably joined top, bottom and side walls forming a tubular structure and having end closure panels, one wall of the carton being of double ply construction having inner and outer panels and being in engagement with the ends of the packaged cans, and a pair of thickening panels foldably joined to said inner ply along transverse spaced apart fold lines and being folded into flat face contacting relation with said inner ply to form a three ply wall in engagement with the can ends.

4,958,735

EASY OPEN, HEMETICALLY SEALED, DISPLAY PACKAGE MADE FROM HEAT SHRINKABLE FILM

Robert A. Odabashian, Greer, S.C., assignor to W. R. Grace & Co.-Conn., Duncan, S.C.

Filed Jun. 28, 1985, Ser. No. 749,961
Int. Cl.[5] B65D *65/00*
U.S. Cl. 206—497 **1 Claim**

1. A display package comprising:

(a) a product;

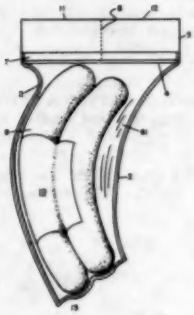
(b) a receptacle formed from a single sheet of heat-shrinkable, single-fold, flexible, heat sealable, gas barrier, thermoplastic sheet material, said receptacle comprising:

1. a shrunken portion, wherein the sheet material is shrunken and conforms generally and closely to the shape of the product;

2. an unshrunken portion having a fold line which forms

one end of the receptacle, and the unshrunken portion being separated from the shrunken portion by a heat seal parallel to and spaced apart from the fold line and having a line of weakness perpendicular to the seal along which an opening tear may be initiated;

3. the sides of said receptacle being formed by heat seals which seal the respective side edges of the sheet together; and



4. the mouth of the receptacle being closed by a heat seal thereby hermetically enclosing the product within the shrunken portion; and

(c) a strip of non-shrinkable thermoplastic material adhered to said unshrunken portion, said strip having a line of weakness corresponding to the line of weakness in the unshrunken portion of the receptacle and dividing said strip into two manually grippable sections that serve as tear tabs to open said package.

4,958,736

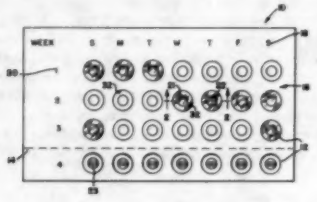
PACKAGE FOR ORAL CONTRACEPTIVE TABLET

John E. Urheim, Lincolnshire, Ill., assignor to Gynex, Inc., Deerfield, Ill.

Filed Mar. 18, 1986, Ser. No. 840,774

Int. Cl.[5] B65D *83/04*

U.S. Cl. 206—531 **8 Claims**



1. An integral package for sequential daily oral administration of pharmacologically active contraceptive tablets comprising:

a carrier sheet provided with an array of 28 compartments arranged in four substantially parallel rows of seven substantially parallel columns, three adjacent rows having an active tablet in each of said compartments, a fourth row having a placebo tablet in each compartment, a pressure rupturable cover over each of said compartments, and a single line of severability in said sheet, said line being situated between and substantially parallel to said row of placebo tablet containing compartments and an adjacent row of active tablets, said carrier sheet defining, on each side of said line, an integral region free of any other lines of severability between said compartments, whereby said fourth row of placebo tablet containing compartments can be readily separated from said three rows of active tablet containing compartments.

4,958,737

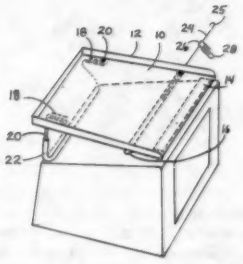
CRT OR COMPUTER MONITOR ACCESSORY TRAY

Abraham E. Auerbach, HCR 2648, Oracle, Ariz. 85623

Filed Jan. 18, 1990, Ser. No. 467,008

Int. Cl.[5] A47F *5/12, 7/00*

U.S. Cl. 206—557 **20 Claims**



1. A tray for placement atop a computer monitor for holding items in the space above said monitor without allowing such items to fall or block the air vents in the top of such monitor, comprising:

a tray having a flat upper surface and means for causing objects placed in said tray to resist falling off a plurality of sides of said tray,

means associated with the undersurface of said tray for enabling said tray to be placed on top of any computer monitor within a range of sizes and shapes without falling off said monitor and without blocking any air vents on the top of said monitor, said means comprising a friction surface at the front of said undersurface of said tray and an adjustable wire support at the rear of said undersurface of said tray.

4,958,738

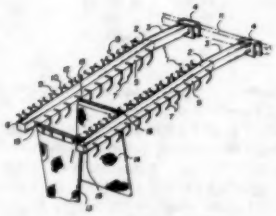
CLOTHING RACK AND HANGER COMPOSITE STRUCTURE

Daniel S. Lee, 1537 Melton Rd., Lutherville, Md. 21093

Filed Oct. 26, 1989, Ser. No. 426,725

Int. Cl.[5] A47F *5/00*

U.S. Cl. 211—89 **6 Claims**



1. A clothing rack and hanger composite structure comprising:

at least two main racks with each having an extension rack extending therefrom, said extension rack extending from the main rack at an angle so as to provide a slight bending

form for giving a slight slope to said rack and hanger composite structure,

a plurality of hook hangers mounted on one side of said main rack, said hook hangers having a C-shaped configuration, respectively,

a plurality of squeezing hangers mounted on the other side of said main rack, said squeezing hangers defining a plurality of V-shaped configurations adjacent to each other for forming a plurality of squeezing spaces between said squeezing hangers,

said hook hangers being disposed so as to be aligned with said squeezing spaces formed between said squeezing hangers for hanging clothes between the hook hangers of one main rack and the squeezing spaces of the other main rack in a straight manner,

a channel engagement attached to one end of said extension rack for engaging the rack and hanger composite structure with a rail support, whereby clothes such as pants, skirts, and the like can be tightly attached to and easily removed from the rack and hanger composite structure.

4,958,739

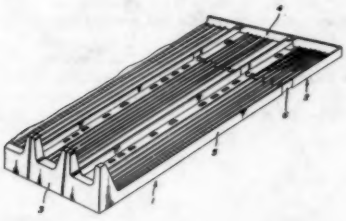
COMPOSITE ORGANIZER AND GRAVITY FEED SHELF

William S. Spamer, Roswell, Ga., assignor to The Mead Corporation, Dayton, Ohio

Continuation-in-part of Ser. No. 391,424, Aug. 9, 1989. This application Oct. 2, 1989, Ser. No. 416,057

Int. Cl.[5] A47F *5/00*

U.S. Cl. 211—153 **12 Claims**



1. A composite shelf arranged for mounting on a flat surface for supporting and displaying articles and comprising a main support unit including a main rectangular planar element having front, rear and opposed side edges, an auxiliary support unit including an auxiliary rectangular planar element having front, rear and opposed side edges one edge of which is of a configuration which is complementary to one edge of said main rectangular planar element, a first plurality of spaced projections formed along said one edge of said main planar element and disposed in the plane thereof, and a plurality of spaced projections formed along said one edge of said auxiliary planar element and in the plane thereof and interspersed between said spaced projections formed along said one edge of said main planar element.

4,958,740

BOTTLE FOR CONTAINING AND DISPENSING A PLURALITY OF DIFFERENT CONTENTS

Eugene R. Wilkerson, Destin, Fla., assignor to Florida Isles Enterprises, Inc., Destin, Fla.

Filed Aug. 29, 1989, Ser. No. 399,842

Int. Cl.[5] B65D *1/04, 23/10, 41/04, 41/16*

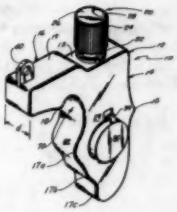
U.S. Cl. 215—6 **11 Claims**

1. A bottle for containing and dispensing liquid and solid substances comprising;

(a) a main body portion defining opposing sidewalls, said sidewalls having concave and convex surfaces thereby establishing a hand grip portion;

(b) a handle portion integrally formed with the upper portion of one of said sidewalls of said main body portion, said handle portion projecting laterally outwardly from said one of said sidewalls, said main body portion and handle portion communicating and thereby forming a first containing means of said bottle, said handle portion having concave and convex surfaces, thereby establishing a hand grip portion, the web of said handle portion including a smooth continuous concave surface contiguous with said upper portion of said one of said sidewalls of said main body portion;

(c) a neck portion having a passageway therethrough provided in the upper surface of said main body portion



through which a first substance may be introduced into or removed from said first containing means formed by said main body portion and said integral handle portion;

(d) closure means for said passageway adapted to be selectively applied to or removed from said neck portion; and,

(e) a second containing means including an annular recess provided in the surface of said main body portion, said recess having a raised annular neck portion integral therewith and raised above said surface of said main body portion, and removable closure means therefor formed to sealably adapt to said neck portion, said closure means being fixedly connected to said raised annular neck portion.

4,958,741

MODULAR MASS-FLOW BIN

Jerry R. Johanson, San Luis Obispo, Calif., assignor to Jr Johanson, Inc., San Luis Obispo, Calif.

Filed Jun. 14, 1989, Ser. No. 365,916

Int. Cl.[5] B65D *25/14*

U.S. Cl. 220—83 **21 Claims**

1. A bin module comprising:

a first section that extends upwardly from a circular lower edge of diameter d to an oval-shaped upper edge, the major axis of the oval-shaped upper edge exceeding the diameter of the circular lower edge;

a second section that extends upwardly from an oval-shaped lower edge that is attached to the upper edge of said first section to an oval-shaped upper edge, the major and minor axes of the upper edge not exceeding the major and minor axes of the lower edge, the vertical height of said second section being h_1;

a third section that extends upwardly from an oval-shaped lower edge that is attached to the upper edge of said second section to a circular upper edge, the diameter of the circular upper edge exceeding the minor axis of the oval-shaped lower edge; and,

a fourth section that extends upwardly from a circular lower edge that is attached to the upper edge of said third section to a circular upper edge the diameter of which does not exceed the diameter of the lower edge, the vertical height of said fourth section being h_2.

4,958,742

CONTAINER WITH SAFETY VALVE

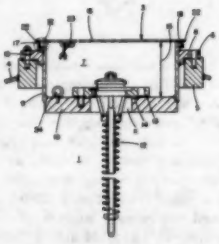
Ernst Berwald, Bergkamen-Heil, and Winfried Lewe, Kamen, both of Fed. Rep. of Germany, assignors to Schering Aktiengesellschaft, Bergkamen, Fed. Rep. of Germany

Filed Jul. 7, 1988, Ser. No. 216,370

Claims priority, application Fed. Rep. of Germany, Jul. 17, 1987, 3723645

Int. Cl.[5] F16K *15/02*

U.S. Cl. 220—209 **10 Claims**



1. A pressure relief assembly for a container for the receipt of liquids, said container having a cylindrical element fixed in an opening for accommodating said pressure relief assembly, said element extending perpendicular to a wall of said container, said pressure relief assembly comprising a cylindrically shaped housing, said housing being provided with a removable cover frictionally secured to a first end of said cylindrical housing and a bottom wall fixedly and non-removably secured to a second end of said cylindrical housing, a circumferential mounting flange secured to the outer circumference of said cylindrical housing adjacent said first end, said bottom wall of said cylindrical housing being provided with an opening for mounting a relief valve which extends outwardly into said container from said pressure relief assembly; wherein said relief valve extends into said assembly less than half the length of said cylindrical housing, said relief valve being secured to a mounting plate through a sealing gasket to said bottom wall, said mounting plate having a diameter greater than said opening in said bottom wall.

4,958,743

CLOSE OUT FITTING

Randall C. Hatton, 3910 Middlegate St., Westlake, Calif. 91361, and Gerald W. Tyree, 8870 O'Melveny, Sun Valley, Calif. 91352

Continuation of Ser. No. 132,760, Dec. 14, 1987, abandoned. This application May 18, 1989, Ser. No. 357,628

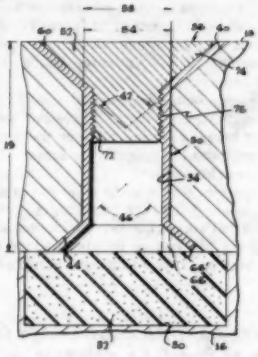
Int. Cl.[5] B65D *41/04*

U.S. Cl. 220—288 **4 Claims**

1. In a structure, the combination of:

a structural element, the structural element having a material injecting port extending from a first surface to a second surface thereof, said port countersunk at both its ends;

a hollow tubular sleeve installed in said port, said sleeve having flared ends in contact with said countersunk ends of said port, and flush with said first and second surfaces of said structural element, a length equal to the length of said port and internal threads located between said flared ends; and



a plug having external threads in removable engagement with said internal threads of said sleeve.

4,958,744

CONTAINER CLOSURE

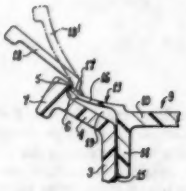
Peter K. Bayly, Euroa, Australia, assignor to Kingsley Nominees Pty. Ltd., Blackburn, Australia

Filed Apr. 11, 1989, Ser. No. 336,054

Claims priority, application Australia, Apr. 12, 1988, PI7705

Int. Cl.[5] B65D *51/12*

U.S. Cl. 220—305 **13 Claims**



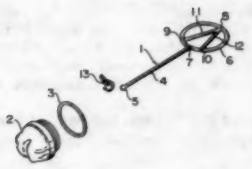
1. A closure for the open mouth of a container having an internal sealing surface which defines or is adjacent to said open mouth and against which said closure engages to close said open mouth, said closure comprising, a main body, sealing means extending radially outwardly from around the periphery of the main body, said sealing means including a sealing edge which is engageable with said sealing surface and a resiliently flexible web connecting said sealing edge to said main body, said web being movable between a sealing condition and a relaxed condition, a diameter of the sealing edge in the sealing condition being less than a diameter of the sealing edge when the web is in the relaxed condition, said web being movable to said sealing condition when said closure operatively closes said open mouth, the resilience of the web material being such that said sealing edge is thereby pressed against said sealing surface, said main body being considerably less flexible than said web, said main body carrying a locating means on the operatively inner side thereof to facilitate locating said closure relative to said open mouth, said location means comprising a guide wall connected to the lower side of said main body around the radially outer edge portion thereof, said guide wall projecting into said container when said closure is in said sealing condition.

4,958,745

CONNECTOR TANK MEANS FOR CAP FOR MOUTH OF TANK

Isao Masuda, Tachikawa; Toshio Tsomo, Tokyo, and Fujio Sasaki, Mitaka, all of Japan, assignors to Kioritz Corporation, Yokyo, Japan

Continuation of Ser. No. 848,855, Apr. 4, 1986, abandoned. This application Jul. 2, 1987, Ser. No. 70,873
Claims priority, application Japan, Apr. 23, 1985, 60-60440
Int. Cl.[5] B65D *55/16*
U.S. Cl. 220—375 **1 Claim**



1. Connector means formed as a unitary structure for a cap of a mouth of a tank comprising:

an elongated portion connected at one end thereof to the cap; and

an engaging member connected to an opposite end of said elongated portion and located inside the tank for engagement with the inner side of the mouth of the tank;

wherein the improvement resides in that said engaging member comprises:

an annular portion formed of elastic material connected to the opposite end of said elongated portion; and

a plurality of beam-like portions formed integrally with said annular portion and arranged substantially in the form of the letter V in said annular position,

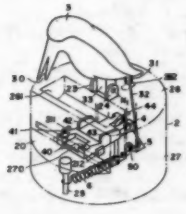
said annular portion being bendable along said beam-like portions in an arrow-like form only in a direction to be inserted into the mouth of said tank.

4,958,746

TOOTH-PICK DISPENSER

Ching K. Wu, Room 2, 11F, Shoei-Yuan Road, Taipei, Taiwan

Filed Aug. 16, 1989, Ser. No. 394,477
Int. Cl.[5] A24F *15/04*; G07F *11/00*
U.S. Cl. 221—24 **1 Claim**



1. A tooth-pick dispenser comprising

a substantially cylindrical housing having a perforated top and a cut-off portion defined by a vertical side wall extending downwardly from the top and a horizontal side wall parallel to the top;

a tooth-pick filling opening formed in the top of the housing close to the cut-off portion and adapted to fill tooth-picks into the housing;

an opening formed in the vertical side wall and spaced from the top of the housing;

a tooth-pick chamber in the housing having means for supporting tooth-picks and for delivering them downwardly one at a time;

a drawer member disposed in the opening of the vertical side wall for reciprocation between a tooth-pick receiving position in the housing and a tooth-pick delivery position exterior of the housing and having a slot cut longitudinally from a rear end thereof and means for catching a tooth-pick delivered from the chamber in the housing and conveying it to the delivery position;

at least a projector extending upwardly from a mid portion of the drawer member for pushing tooth-picks stacked in the chamber toward the vertical side wall when the drawer member moves from the receiving position to the delivery position;

guide means abutting lateral sides of the drawer member for guiding the reciprocating movement of the drawer member;

a pick up device having a structure simulating the appearance of a seagull having a supporting member extending downwardly from a flank portion thereof, a head portion spaced from the supporting member and provided with a tooth-pick pickup means extending forwardly outwardly and having an opening diverging outwardly from the head portion and a tail portion opposite to the head portion;

means for pivotally supporting the pickup device on the top of the housing whereby the seagull pickup device may be manually osciallated between a lower pickup position and a raised dispensing position; an angular member having three corner portions, and rotatably mounted on a supporter in the housing;

means for pivotally supporting a first corner portion of the angular member to the rear end of the drawer member in the slot thereof;

a link pivotally interconnecting the tail portion of the seagull pickup device and a second corner portion of the angular member so as to effect synchronized movement thereof upon actuation of said seagull pickup device;

a spring member with two ends pivotally interconnecting a third corner portion of the angular member and an arm extending downwardly from the horizontal side wall of the housing; and

whereby, when said seagull pickup device is swung to the pickup position, said link and angular member will operate to move said drawer member to the exterior delivery position and the projector on the drawer member will push the tooth-picks stacked in the chamber to move toward the vertical side wall of the housing, and when said seagull pickup device is released, said link and angular member will be operated by the spring member to fully retract said drawer member to its inner receiving position and swing the seagull pickup device to its raised dispensing position.

4,958,747

BOTTLED WATER DISPENSER

Kerney T. Sheets, P.O. Box 771, Babin Rd., Duplessis, La. 70728

Filed Aug. 15, 1988, Ser. No. 232,842
Int. Cl.[5] B67D *5/08*
U.S. Cl. 222—67 **7 Claims**

1. A water dispensing apparatus for use with large narrow-mouth bottles comprising:

(a) a cabinet having a lower end portion with an expanded spacial area adapted to receive a large water bottle having a narrow-mouth portion and for supporting the bottle in an upright position wherein the narrow open mouth is at an upper position during use;

(b) a suction flowline positioned to withdraw fluid from the bottle via the narrow open mouth;

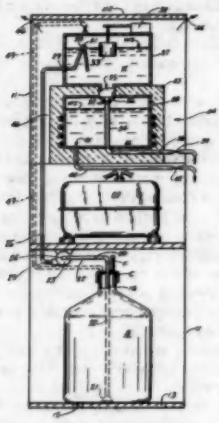
(c) pump means for transmitting fluid from the contents of the bottle via the suction flowline in a generally upwardly direction, the pump including suction and discharge por-

tions, said suction portion communicating with said bottle through said suction flowline;

(d) pump discharge flowline means communicating with the discharge portion of the pump for transmitting fluid from the pump;

(e) a first, non-insulated ambient temperature water reservoir means, positioned generally vertically above the water bottle area of the cabinet and receiving flow from the pump via the discharge line;

(f) a second, refrigerated and insulated water reservoir means, positioned generally vertically above the bottle



and in close proximity to the first reservoir means for maintaining the water therein cold at a refrigerated generally constant temperature, below ambient temperature;

(g) a third flowline means extending from the first reservoir to the second reservoir for transmitting ambient temperature water to the second reservoir, and including a duct portion which carries ambient water; and

(h) a pair of spigots mounted on the cabinet for respectively dispensing ambient and cooled water and including flowlines that communicate respectively with the duct for ambient water and with the second cold reservoir.

4,958,748

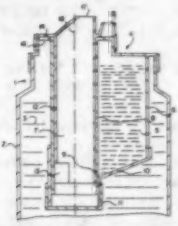
ADHESIVE CONTAINER/FEEDER

Masaaki Otake, Ohmiya, Japan, assignor to Sekisui-Iko Co., Ltd., Tokyo, Japan

Filed Jul. 7, 1989, Ser. No. 376,736

Int. Cl.[5] B65D *37/00*

U.S. Cl. 222—131 **14 Claims**



1. An adhesive applicator device comprising an elastic container filled with liquid adhesive, said container having an outlet nozzle, a case accommodating said container such that said outlet nozzle projects from said case, said case having a pair of diametrically opposed window openings, push button means comprising opposed push button projections extending into said window openings, said push button means further comprising biasing means connected to and extending from said push button projections for biasing said push button projections outwardly into said window openings, whereby said liquid adhesive is discharged from said outlet nozzle one drop at a time by manually pushing said opposed push button projections from an initial position to a displaced position against the bias of said biasing means, said push button projections being returned to said initial position by said biasing means when said manual pushing is discontinued.

4,958,749

APPLIANCE FOR SIMULTANEOUSLY DISPENSING BOTH FREE-FLOWING AND POURABLE SUBSTANCES

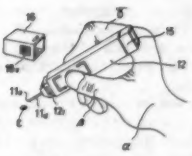
Werner Kuenzel, Langenfeld, and Peter Vierkoetter, Leverkusen, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 254,909

Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734132

Int. Cl.[5] A47G *19/30*

U.S. Cl. 222—133 **7 Claims**



1. An appliance including integral first and second receptacles for storing and substantially simultaneously dispensing through first and second pouring openings via tilting of said appliance to initiate a dispensing cycle, a free-flowing substance at a predetermined flow rate, and a pourable substance, respectively, wherein the improvement comprises dosing element means in said second receptacle for isolating and limiting to a predetermined quantity the pourable substance dispensed in each dispensing cycle, whereby immediately after the predetermined quantity of said pourable substance is dispensed said appliance is turned upright for terminating the flow of said free-flowing substance, thereby substantially obtaining a predetermined quantity and dose or mixture of said free-flowing and pourable substances.

4,958,750

DISPOSABLE FOAM DISPENSING APPARATUS

Steven H. Palmert, Brookfield, Wis., and Robert F. Ziems, McLean, Va., assignors to Two-Part Foam Propellants, Inc., Cudahy, Wis.

Filed Nov. 21, 1989, Ser. No. 439,874

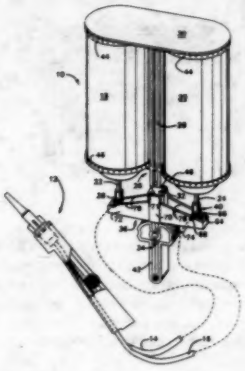
Int. Cl.[5] B67D *5/52*

U.S. Cl. 222—135 **7 Claims**

1. In a disposable foam dispensing kit for simultaneously discharging separate fluid components of a resin system from a pair of pressurized cylindrical cans each having axially projecting rims at opposite ends and an axially movable valve stem projecting axially from the center of one end, each of said valve stems being operative to release a fluid component upon axial movement inwardly on the axis of said cans, respectively, retaining means for positioning said cans in parallel relationship with the valve stems of each can extending in laterally spaced parallel relationship, means for simultaneously actuating said valve stems to release the fluid components from both cans, discharge nozzle means for mixing the fluid components

of the resin system and discharging same as foam, and fluid conduit means extending between said valve stems and said discharge nozzle means, the improvement comprising:

a single carrier component to define said retention means, said carrier component comprising a single central post having spaced rim engaging projections to receive and retain the rims of both cans by snap action, said post extending as a tongue portion between the laterally spaced parallel valve stems of the cans retained by said carrier;



a cam fulcrum at the projecting end of said tongue portion;

bridge means slidably receivable over said cam fulcrum and said tongue portion to engage the ends of the valve stems projecting from both said cans retained by said carrier; and

a cam lever connected to said cam fulcrum to advance said bridge means against the ends of said valve stems upon pivotal movement of said cam lever about said cam fulcrum.

4,958,751

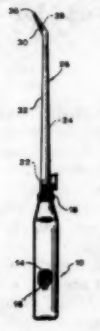
SUB-GINGIVAL MEDICAMENT APPLICATOR

John P. Curtis, Bloomsbury, and James H. Kemp, Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,259

Int. Cl.[5] B67D *1/07*; A61M *37/00*, *31/00*

U.S. Cl. 222—192 **3 Claims**



1. A sub-gingival medicament applicator comprising an aerosol container having a filling of gingival medicament and a non-toxic propellant, said container having an outlet opening and a valve for controlling fluid flow through said opening, actuator means on said container for said valve, and a wand secured to said container in alignment with said opening, said wand having a flexible end piece having a discharge port, and said wand having a passage therethrough from said opening to said port, and means in said end piece to cause vibration thereof.

4,958,752

INVENTION BUMP FOR LIQUID MEDIA

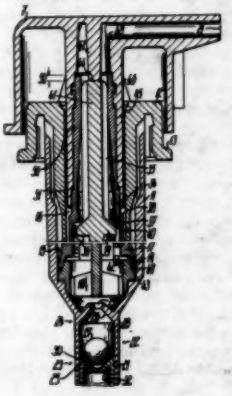
Leo Maerte, Sipplingen, Fed. Rep. of Germany, and Michael Wolter, Landschlacht, Switzerland, assignors to Erich Pfeiffer GmbH & Co. KG., Fed. Rep. of Germany

Continuation of Ser. No. 885,505, Apr. 23, 1986, Pat. No. 4,776,498. This application Aug. 3, 1988, Ser. No. 227,652

Claims priority, application Fed. Rep. of Germany, May 15, 1985, 3717558

Int. Cl.[5] B05B *11/02*

U.S. Cl. 222—321 **17 Claims**



1. A delivey apparatus for discharging liquid media and the like from a storage chamber in an inverted position, said apparatus comprising:

a thrust piston having a cylinder and a piston unit for defining a pump chamber therein, said cylinder and said piston unit being displaceable with respect to each other over a pump stroke;

a discharge passage being provided for discharging the media from the piston pump and the cylinder having suction passage means for filling the piston pump with media in the inverted position;

an air pressure compensating duct in the cylinder of said piston pump for controlling the pressure in the storage chamber; and,

a slide control element for closing said air compensating duct over at least a part of the pump stroke, wherein said piston unit has a piston lip slidably engaging the cylinder, said piston lip forming the slide control element both for closing the air compensating duct and for closing the suction passage for the inverted position.

4,958,753

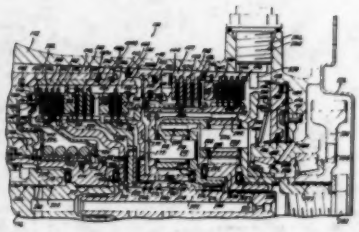
CLUTCH REACTION AND PRESSURE PLATES IN AN AUTOMATIC TRANSMISSION

Thomas D. Nogle, Troy; Berthold Martin, Utica, and Thomas M. O'Brien, Redford, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Continuation of Ser. No. 189,492, Apr. 29, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 432,311

Int. Cl.[5] **F16D** *25/063*

U.S. Cl. 192—85 AA **4 Claims**



1. In a vehicle transmission housing enclosing, a rotating input member, an output member, a gear assembly for changing the ratio of torque between the input member and the output member, a plurality of clutch and brake assemblies for coupling the input member to predetermined members of the gear assembly and for coupling predetermined members of the gear assembly to the transmission housing, a fluid actuating device movable axially to engage and disengage at least one said clutch assembly, a reaction member disposed on one side of at least one said clutch assembly, a plate assembly comprising:

a plate member disposed on another side of at least one said clutch assembly and secured to the fluid actuating device to allow the fluid actuating device to sandwich at least one said clutch assembly between said reaction member and the plate member of the fluid actuating device; and

web means integral with said plate member to increase the axial rigidity of said plate member to restrict clutch deflection, said web means comprising a web portion spaced radially from said plate member and being integral with said plate member at a plurality of locations circumferentially about the perimeter of said plate member, said web portion being secured to the fluid actuating device and being moveable axially relative to at least one said clutch assembly.

4,958,754

DISPENSER OR SPRAYER WITH VENT SYSTEM

Stephen R. Dennis, St. Charles, Mo., assignor to Continental Sprayers, Inc., St. Peters, Mo.

Filed Mar. 1, 1989, Ser. No. 317,568

Int. Cl.[5] **B67D** *5/40*

U.S. Cl. 222—383 **46 Claims**

1. A dispenser adapted to be attached to a container for holding a fluent material to be dispensed to the ambient comprising:

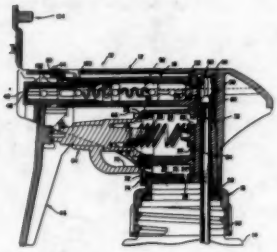
(a) a housing adapted to be attached to the container;

(b) a first outwardly opening bore, having an outer and inner end, located within said housing and having an outlet for dispensing the fluent material;

(c) a second outwardly opening bore, having an outer and inner end, located within said housing and having a first piston shiftable within the second bore;

(d) operating means for shifting the first piston within the second bore between a non-pumping and pumping position;

(e) a third outwardly opening bore, having an outer and inner end, located within said housing and having venting means for permitting communication between the container and the ambient, wherein said first, second, and third bores each have a center axis, and said center axes of said bores are both offset and parallel relative to each other;



(f) a second piston shiftable within said third bore for sealing the venting means when in a non-pumping position and allowing communication between the container and the ambient when said second piston moves from said non-pumping position toward said pumping position, said second piston being operably connected to said operating means.

4,958,755

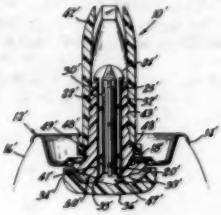
VALVE FOR PRESSURIZED DISPENSING CANS

William Gerstung, Santa Clarita, Calif., assignor to Gerstung Enterprises, Inc., Miami, Fla.

Continuation-in-part of Ser. No. 171,070, Mar. 21, 1988, Pat. No. 4,856,684, and a continuation of Ser. No. 113,995, Oct. 29, 1987, abandoned, and Ser. No. 34,679, Apr. 6, 1987, abandoned. This application Jul. 17, 1989, Ser. No. 380,562

Int. Cl.[5] **B65D** *83/46*

U.S. Cl. 222—402.23 **5 Claims**



1. An improved valve for attachment to the open upper end of a container for controlling discharge of pressurized, flowable material from the container, said valve including sealing means effective for preventing "blow-by" and oozing through a range of pressures, from an initial, elevated pressure to a lower pressur when the flowable material is substantially discharged from the container, said valve comprising, in combination:

a) a generally horizontally extending can connector of rigid material adapted to sealingly close said container about the open upper end, said connector having a vertical opening extending therethrough bound by an edge;

b) a valve stem of rigid material comprising a generally horizontal base positioned below said connector and said opening, and said stem including a generally vertical rod extending upwardly from said base and through said opening, said rod including an upper distal end comprising a

peripherally extending expanded open work head defining a surface said valve stem base, and said base having a generally conical portion having a surface extending upwardly and converging from said base to said rod, and said base having an upper axially facing surface including said conical portion surface, and said base further including an inverted skirt peripherally mounted thereon;

c) a flexible, resilient, tubular grommet having an axial through passageway, said grommet including a lower portion defining an inverted dome-shaped axially downwardly facing surface having a lip about the passageway, and said grommet further including an upper axially extending portion surrounding said valve stem, said grommet extending up through said connector opening and being disposed around said valve stem base closely adjacent said inverted dome-shaped surface, said grommet having an upper face about said passageway and said surface of said valve stem head facing said valve stem base being sized to normally dwell on said upper grommet face, said lip of said grommet being at the lowermost point if said downwardly facing surface confronting the upper surface of said valve stem base, said grommet and valve stem being sized and configured with the lip in a normal position in close adjacent relation to said conical surface;

d) mutually interengaging means on the grommet and on said connector to sealingly close about the edge of said vertical opening;

e) said grommet lip comprising a sealing ring in said passageway in sealing engagement with said generally conical surface of said rod when said valve is installed in closing relation of the open upper end of a pressurized container and axially upwardly directed forces are exerted on said valve stem base, said grommet lip comprising an annular, deformable, pointed grommet portion of generally triangular transverse cross-section as seen in elevation with the apex of said grommmet portion defining a generally radially, inwardly and downwardly pointed, distally weakened, lip portion for sealing engagement with said conical portion if said rod, said inverted dome-shaped axially downwardly facing surface and lip apex being effective to deformingly and sealingly contact said upper axially facing surface including said conical portion surface when the container is under elevated, initial pressure to prevent "blow-by" of pressurized liquid and to eliminated entrapment of entrained solids between said grommet and valve stem, and as the pressure is reduced on removal of the flowable material from the container, said inverted dome-shaped axially downwardly facing surface and said pointed distally weakened portion are adapted to gradually relax returning toward is normal position with the apex of said lip portion maintaining sealing contact with the conical portion; and

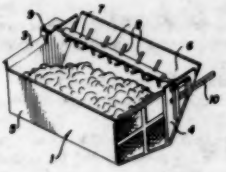
f) an open-topped vertically extending cover releasably secured to the tubular portion of said grommet above said connector opening for removal of said cover and cleaning of said rod, rod head, cover and grommet, said cover being of rigid material and having an inside surface closely adjacent the upper vertically extending tubular grommet, so that when the cover is tilted sideways by finger pressure, said grommet will yieldingly tilt together with said rigid valve stem from said vertical position causing a corresponding tilt of said stem base and rod out of sealing engagement of the apex of said grommet lip and said upwardly facing surface including said conical portion surface of said rod for temporarily dispensing pressurized flowable material from said container, the elasticity of said grommet automatically returning said stem to a sealing position with aid of the lip again being in sealing engagement of said conical portion upon removal of said tilting pressure.

4,958,756

COTTON BASKET UNLOADING REGULATOR

Gerald Conway, Rte. 1, Box 105, Itta Bena, Miss. 38941

Filed Dec. 20, 1988, Ser. No. 286,804
Int. Cl.[5] B65D *83/00*
U.S. Cl. 222—164 **4 Claims**



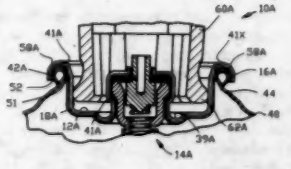
1. A cotton basket for delivering cotton to a cotton trailer comprising, a container having a pair of side walls, a rear wall interconnecting the side walls on one side thereof, an inclined discharge wall interconnecting the side walls on the opposite side thereof, a bottom wall interconnecting the bottom edge of the rear wall and inclined discharge wall, a pair of outwardly extending arms mounted on the side walls for supporting the cotton basket when the cotton basket is lifted to dump cotton into a cotton trailer, means mounted between the upper ends of the side walls for breaking up wads of cotton, regulating the thickness of cotton delivered to a cotton trailer and terminating the flow of cotton into a cotton trailer, said means comprising a rotatable shaft having a plurality of elongated fingers on said shaft, said elongated fingers extending between one third and one half the distance between the axis of the rotatable shaft and the upper edge of the inclined discharge wall, and motor means mounted on the side wall adjacent said shaft for driving said rotatable shaft independently of movement of the cotton basket.

4,958,757

FERRULE FOR SEALING WITH A CONTAINER

James E. Greenebaume, II, Highland Park, Ill., assignor to Pittway Corporation, Cary, Ill.

Continuation-in-part of Ser. No. 862,282, May 12, 1986, Pat. No. 4,813,576, which is a continuation-in-part of Ser. No. 733,207, May 13, 1985, Pat. No. 4,792,067. This application Dec. 19, 1988, Ser. No. 286,966
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.
Int. Cl.[5] B65D *83/14*
U.S. Cl. 222—394 **18 Claims**



1. An improved ferrule for sealing with a container of a dispensing device, the container having an annular bead extending about an opening in the container with the annular bead having an outer bead periphery defining an inner bead surface and an outer bead surface, the inner bead surface being generally planar and with the outer bead surface being generally annular and with the outer bead surface being established generally normal to the inner bead surface, comprising in combination:

a ferrule comprising a central region and a peripheral rim;

said central region of said ferrule being established for receiving the dispensing device for providing controlled fluid flow between the interior and exterior of the container; said peripheral rim of said ferrule extending outwardly of said central region;

said peripheral rim of said ferrule having an inner peripheral region being generally planar and located proximate said central region;

said peripheral rim of said ferrule having an outer peripheral region being generally annular and located remote said central region;

said outer peripheral region of said ferrule being established generally normal to the said planar inner peripheral region of said ferrule;

said inner peripheral region and said outer peripheral region of said ferrule being established for cooperating with the inner bead surface and the outer bead surface of the container;

a bevel integrally formed in said ferrule between said inner peripheral region and said outer peripheral region for inhibiting said inner peripheral region of said ferrule from fully contacting the inner bead surface of the annular bead of the container when said ferrule is disposed upon the container;

said bevel of said ferrule being deformed when said ferrule is sealed to the annular bead of the container to approximate the general shape of the outer bead periphery of the annular bead and to move said inner peripheral region of said ferrule proximate the inner bead surface to provide a sealing engagement between said ferrule and the container.

4,958,758

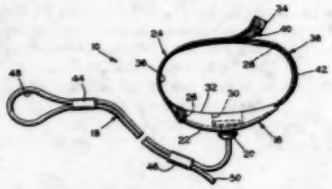
MULTI-LOOPED CANE RETAINING STRAP

Jerome E. Tipple, and Margie K. Tipple, both of Rte. #1, Box 212, Lagro, Ind. 46941

Continuation of Ser. No. 109,404, Oct. 19, 1987, abandoned. This application Apr. 19, 1989, Ser. No. 341,280

Int. Cl.[5] A45F *5/00*

U.S. Cl. 224—267 **11 Claims**



1. A multi-looped cane retaining strap for releasable connection at one end to a cane, and at the opposite end to a wrist of a cane user, said strap comprising:

a molded plastic elongated body having a curved rear face adapted to conform to and extend longitudinally from side to side of a user's wrist;

a longitudinally extending stiffening member formed at one end of said body, and a transverse slot formed in an opposite end of said body;

a flexible strip of material having one end enclosing and attached to said stiffening member at said one end of said body;

a nose means attached to an opposite end of said strip;

a releasable fastening means attached to said strip for maintaining said flexible strip of material in a loop;

a flexible cord;

a pair of spaced apart fasteners slidably attached to said cord, said cord being doubled back on itself to form a loop therein, one of said fasteners selectively determining a length of said cord and the other of said fasteners selectively determining a size of said loop; and

swivel means rotatably attached to said body and attached to an end of said cord opposite said loop in said cord.

4,958,759

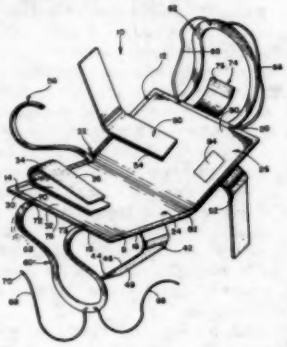
COMBINED BOOK COVER BOOK CARRIER

Irene Jarvis, P.O. Box 021770, Brooklyn, N.Y. 11202

Filed May 17, 1989, Ser. No. 352,886

Int. Cl.[5] A45F *5/12*

U.S. Cl. 224—151 **2 Claims**



1. A combined book cover and book carrier comprising:

(A) a body having

(1) first and second side edges and a length dimension as measured between said first and second side edges,

(2) first and second end edges and a width dimension as measured between said first and second end edges,

(3) an inner surface,

(4) an outer surface, and

(5) a foldable spine section located intermediate said end edges and extending from said first side edge to said second side edge and dividing said body into first and second portions, said spine section being foldable to permit said first section to be placed on top of said second section;

(B) a book holding means including

(1) first, second, third and fourth straps attached to said body, with said first and second straps being identical and said third and fourth straps being identical,

(2) each of said first and second straps being elongate and including an upper surface and a lower surface with fastener means being positioned on said lower surface, said body including fastener means on said body inner surface, and the fastener means on said first and second straps being attached to said body inner surface by said body fastener means,

(3) each of said third and fourth straps being elongate and being connected to said body adjacent to said body second side and having an upper surface and a lower surface, and having fastener means on said strap upper surface, said third and fourth straps being located approximately intermediate between said spine section and a corresponding one of said body end edges, and having the fastener means on said third and fourth straps co-operating with the fastener means on said first and second straps to releasably couple said third and fourth straps to said first and second straps;

(C) a book mark including an elongate strap attached at one end thereof to said body adjacent to said spine section;

(D) carrying means which includes

(1) first and second handles each attached to said body adjacent to said body end edges to form loops,

(2) first second, third and fourth elongate extension straps each fixedly attached at one end thereof to said handles

near the middle of said handles, and each having fastener means on another end thereof, and

(3) fastener means on said body adjacent to said handle for co-operating with said fastener means on said extension straps to releasably hold said extension straps in place; and

(E) closing fastener means on said body and including

(1) a strap attached at one end thereof to said body second end edge and having fastener means thereon, and

(2) fastener means on said body adjacent to said body first end edge for co-operating with the fastener means on said closing fastening means strap.

4,958,760

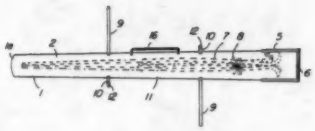
MULTI-PURPOSE CARRIER FOR SKIS AND THE LIKE

Ethel Mulé, and Charles Mulé, both of 5407 Windermere Court, Burlington, Ontario, Canada L7L 3M8

Filed Jun. 9, 1989, Ser. No. 363,995

Int. Cl.[5] A45F *4/02*

U.S. Cl. 224—153 **8 Claims**



1. A carrier bag adapted to carry longitudinally extending articles on a parallel bar roof rack and convertible to the formate of a back-pack comprising:

(a) a bag of foldable fabric material having upper and lower longitudinally extending face portions, with a centrally located central panel portion, and edge portions joining said face portions, said edge portion being openable at one end to permit insertion of articles such as skiis;

(b) a pair of straps of extended length, each attached at one of their respective attachement ends to opposite sides of said central panel portion of said bag proximate said edge portions, said attachment positions being diagonally displaced from each other accross said central panel portion;

(c) a pair of complementary connector means attache to opposite sides of said central panel, said connector means being proximately located to said central panel and being adapted to releasably connect to said straps, said connector means further being diagonally spaced from each other across said central panel portion and attached to said central panel portion at points opposite the attachment positions of said straps; and

(d) fastener means on said face portions adapted to hold the outer portions of said bag on either side of said central panel in position when folded in nested fashion to rest against said central panel,

whereby said carrier bag may be alternatively attached to a parallel bar roof rack by joining said straps to the complementary connector means located directly opposite to the attachment ends of said straps, and may be converted to the format of a back-pack by joining said straps to the respective complementary connector means located on the same side of said central panel portion as the attachment positions of each respective strap.

4,958,761

DEBRIS DEFLECTOR FOR TRANSPORTED CYCLE

Allen Tenney, Box 75, Saddleback, Bend, Oreg. 97701

Continuation-in-part of Ser. No. 150,732, Feb. 1, 1988, abandoned. This application Jun. 2, 1989, Ser. No. 360,290

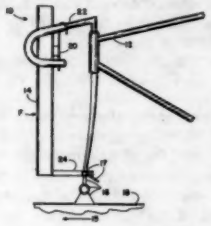
Int. Cl.[5] B60R *27/00*; B62J *23/00*

U.S. Cl. 224—316 **8 Claims**

2. Apparatus for transporting and producing a cycle on a cycle rack, said cycle having a frame and handlebars with a cross member portion and having its front wheel removed, said apparatus comprising in combination:

(a) a cycle rack with a quick-release means for engaging the forks of a cycle;

(b) a generally arcuate continuous rigid shield of lightweight plastic material substantially coextensive with the height of said cycle frame and having an upper portion and a lower portion adapted to be positioned in front of said frame and handlebars;



(c) rigid hook-shaped hanger means rigidly secured to said upper portion of said shield for rigid engagement with the cross member portion of said handlebars of said cycle;

(d) rigid bracket means rigidly secured to said lower portion of said shield for engagement with said quick-release means of said cycle rack; and

(e) said hanger means and said bracket means being sized and shaped such that said shield is positioned at least partially in the space normally occupied by said front wheel when mounted on said cycle.

4,958,762

ULTRASONIC WIRE BONDER

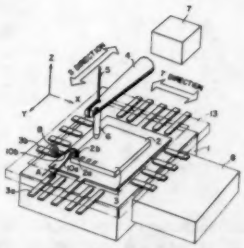
Yasuhiko Shimizu; Hiroaki Kobayashi, and Osamu Matsumoto, all of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 25, 1989, Ser. No. 398,438

Claims priority, application Japan, Aug. 25, 1988, 63-211423

Int. Cl.[5] B23K *20/10*

U.S. Cl. 228—1.1 **5 Claims**



1. An ultrasonic wire bonder for bonding a wire to a semiconductor chip and a lead frame respectively mounted on a workpiece support base, comprising:

first ultrasonic wave applying means for applying a first ultrasonic wave to the wire by propagating ultrasonic energy generated from an ultrasonic oscillator via an ultrasonic horn and capillary; and

second ultrasonic wave applying means for applying a second ultrasonic wave to the workpiece support base, said second ultrasonic wave having the direction of vibration orthogonal to that of said first ultrasonic wave and the vibration energy of said second ultrasonic wave being

controllable independently from said first ultrasonic wave applying means.

4,958,763

METHOD OF SOLDERING ALUMINUM

Amarnath P. Divecha, Falls Church; William A. Ferrando, Arlington, both of Va.; Philip W. Hesse, Ellicott City, Md., and Subhash D. Karmarkar, Great Falls, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 29, 1989, Ser. No. 401,197
Int. Cl.[5] B23K *1/20, 103/10*
U.S. Cl. 228—193 **13 Claims**

1. A process for preparing aluminum materials for soldering which comprises the following steps in order:

(1) coating the surface of an aluminum material selected from the group consisting of aluminum and aluminum alloys with molten $AgNO_3$ at a temperature above the melting point of $AgNO_3$ but below the decomposition temperature of $AgNO_3$;

(2) heating the $AgNO_3$ and aluminum material at a temperature of from the decomposition temperature of $AgNO_3$ to about 550° C. to decompose the $AgNO_3$ and form a thin layer of silver metal on the surface of the aluminum material; and

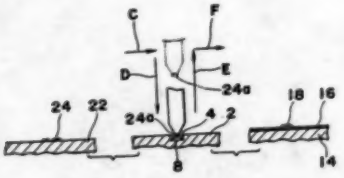
(3) further heating the silver coated aluminum material at a temperature of from about 570° C. to just less than the melting point of aluminum to produce an inter-diffusion layer of silver and aluminum.

4,958,764

DIE-BONDING METHOD OF PELLETS

Buji Hamaie, Innoshima; Kyoichi Ago, Kurashiki, and Kazufumi Hatano, Okayama, all of Japan, assignors to Rohm Co., Ltd., Kyoto, Japan

Filed Dec. 11, 1989, Ser. No. 448,277
Claims priority, application Japan, Dec. 12, 1988, 63-314247
Int. Cl.[5] B23K *37/047*; H05K *3/34*
U.S. Cl. 228—248 **3 Claims**



1. A die-bonding method for pellets, which comprises:

a first step for causing a first paste to adhere to a forward end of a needle,

a second step for lowering the needle from above a pellet located at a first position so as to cause the first paste stuck to the forward end of the needle at said first step, to adhere to the upper portion of said pellet, and also to displace the pellet in a state where said pellet is held at the forward end of the needle by an adhesive force of the first paste,

a third step for lowering the lower portion o said pellet held by the first paste at the forward end of said needle, onto a predetermined portion of a frame applied with a second paste, and

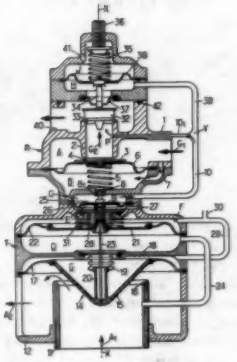
a fourth step for raising said needle after said third step.

4,958,765

DEVICES FOR CONTROLLING AND REGULATING THE GAS SUPPLY TO THE BURNER OF A BOILER OR SIMILAR

Joseph Le Mer, St. Thegonnec, and Bernard Martel, Chatou, both of France, assignors to Chaffoteaux et Maury, Montrouge, France

Filed Oct. 26, 1989, Ser. No. 427,516
Claims priority, application France, Nov. 16, 1988, 88 14882
Int. Cl.[5] F23N *1/10*
U.S. Cl. 236—20 R **8 Claims**



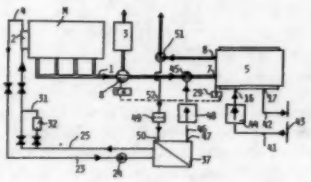
1. Device for controlling and regulating a pressurized fuel gas supplied to a gas burner for heating water flowing through a boiler or similar, comprising a conduit for the pressurized gas, which conduit has an inlet (1), an outlet (2) and a piloted regulator (R) comprising a gas valve (3) urged against a seat (4) by a spring (5) and fast with a sealed membrane (6) which separates a sealed chamber into two compartments, one of these compartments (A) being connected directly to the inlet and comprising the seat of the valve and the other compartment (B) being connected both to the inlet through a calibrated restriction (7) and to the outlet through a leak valve (8) set to a certain pressure by a calibration spring (9), characterized in that said device further comprises means for supplying the burner (U) not only with a flow of pressurized gas but also with a flow of pressurized air, the gas flow being slaved to that of the air so that a combustion of the air-gas mixture in the burner is permanently practically complete, said supplying means comprising an air conduit for the pressurized air, with an inlet (11), an outlet (12) and an intermediate air valve (14) and being adapted so as to slave an opening of the leak valve (8) of the piloted regulator (R) to the air flow through said air conduit, which opening varies in the same direction as said air flow and means for applying to the fuel gas stream leaving the piloted regulator a slight counter pressure as a function of a pressure prevailing downstream of the leak valve (8), which counter pressure varies in an opposite direction to said pressure.

4,958,766

APPLIANCE FOR HEATING MOTOR VEHICLES, MAINLY BUSES DRIVEN WITH INTERNAL COMBUSTION ENGINE

László P. Tóth; Endréné Kiss; Endre Pásztor; Győray Purebl; Ágoston Kórmendy; Gyula Mares; Géza E. Yos, and Béla Horváth, all of Budapest, Hungary, assignors to Budapesti Muszaki Egytem; Mogurt Gepjarmu Kulkereskedelmi Vallalat and Ikarus Karosszeria es Jarmugyar, all of, Hungary

Filed Jan. 9, 1989, Ser. No. 295,221
Int. Cl.[5] B60H 1/02
U.S. Cl. 237—12.3 B 14 Claims



1. An appliance for heating motor vehicles, mainly buses driven by an internal combustion engine, utilizing cooling water and exhaust gases of said engine as a heat source, said engine having a cooling circuit for circulation of the cooling water and a fuel filter, said appliance comprising:

(a) a heat accumulator for accumulating heat energy of the exhaust gases and the cooling water, said heat accumulator being in heat transfer connection with an exhaust pipe of said engine, and being in connection with said cooling circuit of said engine; and

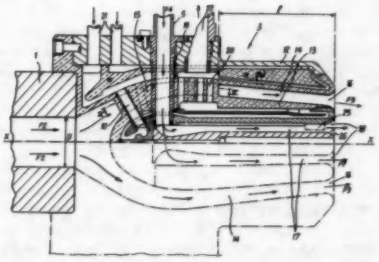
(b) a pump for circulating said cooling water in an extended cooling circuit of said engine, said extended cooling circuit including said heat accumulator, said fuel filter and at least one heater of the vehicle, said pump being operated independently from said engine.

4,958,767

PROCESS AND DEVICE FOR INJECTING A MATTER IN FLUID FORM INTO A HOT GASEOUS FLOW AND APPARATUS CARRYING OUT THIS PROCESS

Maxime Labrot; Jean Feuillerat, both of Bordeaux, and Yves Valvy, Issac, all of France, assignors to Aerospatiale Societe Nationale Industrielle, Paris, France

Filed Apr. 29, 1988, Ser. No. 188,425
Claims priority, application France, Apr. 29, 1987, 87 06084
Int. Cl.[5] B05B 1/24, 17/04
U.S. Cl. 239—13 13 Claims



9. A process for injecting at least one fluid stream into a plasma stream comprising the steps of:

(a) forming a substantially annular plasma envelope from a plasma stream, wherein said plasma envelope is disposed coaxially with the plasma stream, and

(b) injecting a fluid stream into said plasma stream coaxially to the annular envelope, whereby said fluid stream is substantially contained by the annular envelope of plasma for a predetermined distance and subsequently forming a homogeneous stream of plasmas and fluid.

4,958,768

ARTIFICIAL POTTED FLOWER

Yoshiko Ishihara, 8-7, Mori Minami 1-chome, Higashinadaku, Kobe, Japan

Filed Nov. 21, 1988, Ser. No. 274,237
Int. Cl.[5] A61L 9/04; A01N 25/04
U.S. Cl. 239—34 3 Claims

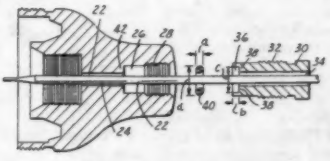
1. An artificial potted flower comprising an artificial flower, a vessel in which the artificial flower is planted, a pack consisting of a casing of water soluble film and, contained therein, a mixture of a powdery deodorant and a powdery water-absorbent synthetic resin, said pack being disposed within said vessel, a cover plate of porous synthetic resin fitted in a top portion of said vessel, and a support means for supporting said artificial flower said support means being disposed in the bottom portion of said vessel in such a manner that a stalk portion of said artificial flower may be passed through said cover plate and secured rigidly to said support means.

4,958,769

COMPRESSED O-RING SPRAY GUN NEEDLE VALVE SEAL

Duane C. Schowiak, Novi, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Dec. 27, 1988, Ser. No. 289,854
Int. Cl.[5] B05B 7/02, 15/02
U.S. Cl. 239—114 2 Claims



1. A seal for a needle valve stem in a paint spray gun used to dispense a two component paint, said seal being provided on an outside cylindrical sliding portion of said needle valve stem and being interposed between said needle valve stem and body of said spray gun, said seal comprising a resilient O-ring, said O-ring being made from a material having a low solvent resis-

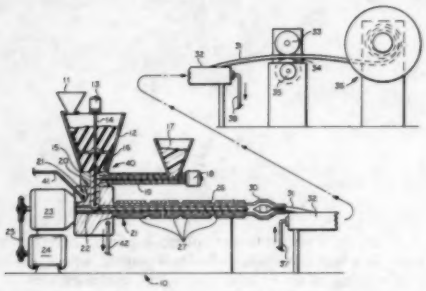
tance and a low coefficient of friction, being mechanically, radially and annularly compressed into an annular well in a bore surrounding said needle valve stem, and being compressed between said annular recess and said annular well by a cylindrical compression means, said O-ring (a) having in its uncompressed state (i) an inner diameter larger than the outer diameter of said needle valve stem, (ii) an annular width greater than the width of said annular recess, and (iii) an outer diameter greater than the inner diameter of said annular well and (b) providing in its compressed state a snug seal against said annular well and a snug seal against the outside diameter of said needle valve stem.

4,958,770

PROCESS FOR MAKING UNIFORM POROSITY FLEXIBLE IRRIGATION PIPE

William S. Mitchell, McKenzie, Tenn., assignor to Precision Porous Pipe, Inc., McKenzie, Tenn.

Filed May 3, 1989, Ser. No. 346,637
Int. Cl.[5] A01G *27/00*
U.S. Cl. 239—145 **14 Claims**



1. The process for forming lengthy flexible porous irrigation pipe having a porosity which is essentially uniform throughout its length comprising the steps of extruding from an unvented extruder through an annular extruder die an intimate mixture of (a) pre-vulcanized elastomeric particles consisting of ground crumb rubber from vehicle tire treads in major amount and (b) low-density polyethylene particles in granular form as a binder in minor amount, both said elastomeric particles and polyethylene particles being essentially moisture-free, forming a continuous length of extruded pipe from said moisture-free intimate mixture, passing the newly-formed extruded pipe through a lengthy water bath to slowly cool the pipe into final form, and controlling the rate of delivery of said newly-formed pipe from said extruder die and through said water bath at essentially the same rate, said pipe exhibiting a porosity of less than about 5 percent variation in fluid delivery throughout its length.

12. As an article of manufacture, the lengthy flexible porous irrigation pipe having a porosity of less than about 5 percent fluid delivery variation throughout its length made in accordance with the process of claim **1**, said pipe being formed from an essentially moisture-free mixture of elastomeric particles and polyethylene particles.

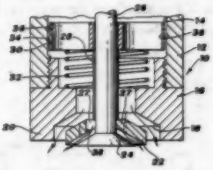
4,958,771

INJECTION NOZZLE

Edward D. Klomp, Mount Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,507
Int. Cl.[5] F02M *61/08*; B05B *1/32*
U.S. Cl. 239—453 **1 Claim**

1. An injection nozzle having an inlet, a valve head, a valve seat, a flow splitter interposed between the valve head and the valve seat, and an operating disc responsive to pressure in the inlet and connected to the flow splitter for varying the position of the flow splitter between the valve seat and the valve head, said operating disc maintaining the flow splitter engaged with the valve seat under low flow conditions, engaged with the valve head under high flow conditions, and spaced from both the valve seat and the valve head under intermediate flow conditions, and wherein said operating disc has a flange upstream thereof cooperating with said inlet to keep said operating disc aligned in said inlet, said valve head has a valve stem, and said operating disc is connected to said flow splitter by a tube that guides said valve stem to keep said valve head aligned with said valve seat, said tube being radially spaced from said inlet to permit flow around said tube to said valve head, valve seat, and flow splitter.

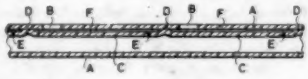


4,958,772

SPRINKLER LINE FOR LOCALIZED IRRIGATION

Augusto Fabbri, Quartiano di Mulazzano, and Aldino Rivi, Ferrara, both of Italy, assignors to Enichem Agricoltura S.p.A., Palermo, Italy

Continuation of Ser. No. 784,818, Oct. 4, 1985, abandoned. This application Dec. 21, 1989, Ser. No. 455,939
Claims priority, application Italy, Oct. 15, 1984, 23151 A/84
Int. Cl.[5] B05B *15/00*
U.S. Cl. 239—542 **5 Claims**



1. A disposable drip irrigation system for localized distribution of water, comprising:

a flexible hose for receiving pressurized water, said hose having a plurality of outlet apertures spaced equidistant from each other and extending along the length of said hose; a plurality of flexible membranes arranged within said hose to cover said outlet apertures, said membranes being attached along its entire periphery to the inner wall of said hose in generally spaced relation thereto so as to define a relatively narrow water passageway as compared to that defined by said flexible hose;

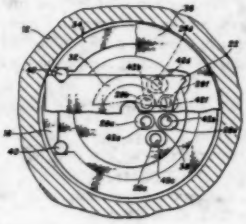
at least one slot approximately equal in length to the diameter of the outlet aperture in each of said membranes oriented in staggered relationship to said outlet apertures and being of an area so as to provide a sufficient pressure drop across said membrane to effectuate a collapse and adherance of said membrane to the inner wall of said hose when pressurized water is fed to said hose, wherein the attachment of the membranes to the inner wall of the hose are in close proximity to the outlet aperture in the hose at one end and to the slot in the membrane at the other end.

4,958,773

FUEL INJECTION

Ernest R. Stettner, Spencerport; Donald D. Stoltman, Henrietta, and Robert S. Taylor, Fairport, all of N.Y., assignors to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1988, Ser. No. 369,505
Int. Cl.[5] F16K *31/02*
U.S. Cl. 239—584 1 Claim



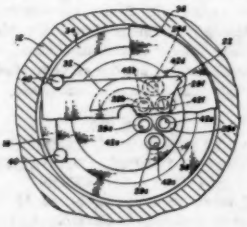
1. An injector comprising a distributor having a plurality of outlet passages and an orifice at the entrance of each of said passages and a valve seat surrounding each of said orifices, a tapered valve biased to engage said valve seats to interrupt fuel delivery through said outlet passages, a valve actuator adapted to pivotally displace said valve from said valve seats to allow fuel delivery through said passages, said valve pivoting about one end thereof as it is displaced whereby the lift of said valve from the valve seat furthest from said end of said valve is greater than the lift of said valve from the valve seat closest to said end of said valve, and wherein said orifices are sized to compensate for the difference in lift of the valve from the associated valve seats, the orifice associated with the valve seat closest to said end of said valve being larger than the orifice associated with the valve seat furthest from said end of said valve.

4,958,774

FUEL INJECTION

Roland S. Taylor, Fairport, N.Y., assignor to General Motors Corporation, Detroit, Mich.

Filed Jun. 21, 1989, Ser. No. 369,599
Int. Cl.[5] F16K *31/02*
U.S. Cl. 239—584 2 Claims



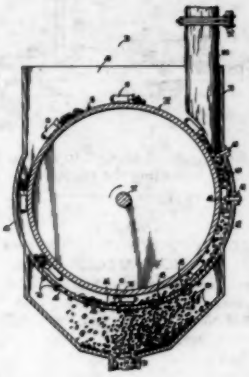
1. An injector comprising a distributor having a plurality of outlet passages and a valve seat surrounding each of said passages, a tapered valve biased to engage said valve seats to interrupt fuel delivery through said outlet passages, a valve actuator adapted to pivotally displace said valve from said valve seats to allow fuel delivery through said passages, and wherein said valve seats are clustered asymmetrically with respect to the central axis of the injector adjacent one end of said valve, and said valve is constrained against rotation on said distributor.

4,958,775

GRATE KNIFE FOR USE WITH WINGED CUTTING KNIFE FOR PRODUCING WOOD CHIPS OR FLAKES

Stanley Arasmith, 5146 Big Texas Valley Rd., Rome, Ga. 31064

Division of Ser. No. 124,043, Nov. 23, 1987, Pat. No. 4,802,631, and Ser. No. 917,855, Oct. 14, 1986, Pat. No. 4,776,375, and a continuation-in-part of Ser. No. 278,737, Dec. 2, 1988, Pat. No. 4,874,024. This application Oct. 13, 1989, Ser. No. 421,618
Int. Cl.[5] B02C *17/02*
U.S. Cl. 241—88.1 11 Claims



3. A wood processing element for reducing the size of a wood member passing across a separating grate defining a filtering slot, comprising:

means defining at least one cutting edge for engaging said wood member such that a portion is removed therefrom;

means defining at least one breakup ledge; and

means for attaching said wood processing element to said separating grate wherein said breakup ledge is positioned relative to said slot and said breakup ledge interferes with said wood portion as said portion passes through said filtering slot.

4,958,776

CENTRIFUGAL-FORCE VIBRATORY GRINDING MACHINE

Henning D. Walther, Haan, Fed. Rep. of Germany, assignor to Carl Kurt Walther GmbH & Co. KG, Wuppertal, Fed. Rep. of Germany

Filed Apr. 20, 1989, Ser. No. 341,152
Int. Cl.[5] B02C *27/14*
U.S. Cl. 241—171 25 Claims

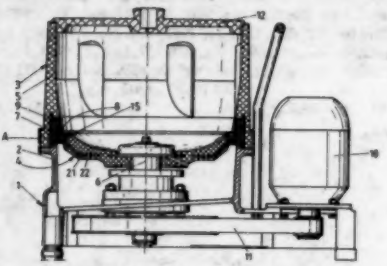
1. A centrifugal-force vibratory grinding machine comprising

a container which receives filling material consisting of workpieces and working bodies, the container being formed of two components of which one component is a wall of the container and the second component is a bottom of the container, the bottom of the container being rotatable relative to the container wall around an axis of the container, there being a separating gap between the bottom and the wall of the container;

at least one discharge element for the removal of particles of filling material which have entered into said gap, said discharge element engaging into the space of the separating gap; and

wherein said discharge element is fixed to one of said container components for movement relative to the other of said container components during rotation of the container bottom; and

said discharge element has an edge positioned for engagement with the particles which have entered into said gap,



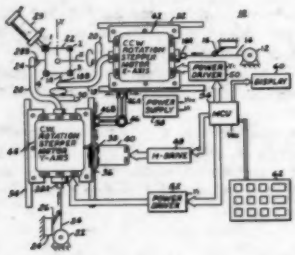
said edge being inclined relative to a plane of rotation of said bottom for deflecting the particles out of said gap.

4,958,777

WINDING MACHINE FOR WOVEN CROSSED-COIL AIR CORE GAUGE

Paul A. Markow, Huntsville, and William Nolle, Hazel Green, both of Ala., assignors to Acustar, Inc., Troy, Mich.

Filed Nov. 13, 1989, Ser. No. 435,214
Int. Cl.[5] H02K *15/00*
U.S. Cl. 242—7.11 **6 Claims**



1. Winding system for weaving a pair of orthogonally positioned stator coils about a non-metallic, coil-bobbin, square frame, the frame having four corner posts, four side walls and a central region containing a non-metallic rotor chamber housing a permanent magnet rotor, the rotor having a shaft extending from a centroid of the rotor and through a port of the chamber in the direction of the posts, said system comprising:

(a) holding means for fixedly holding the frame by a first post and for positioning the shaft perpendicular to an origin of an X-Y coordinate-axis plane, with the first, second, third and forth posts (counting in a clockwise manner about the origin) positioned at a location in a quadrant bound by a positive Y and a negative X axis, a positive Y and a positive X axis, a negative Y and a positive X axis, and a negative Y and a negative X axis respectively;

(b) first winding means for winding a first length of wire about a perimeter of the frame in a spiral-type, counterclockwise motion from said first post in a positive X axis direction to within the location of said second and third posts and then in a negative X axis direction towards said first and fourth posts;

(c) second winding means for winding a second length of wire about a perimeter of the frame in a spiral-type, clockwise motion from said fourth post in a positive Y axis direction to within the location of said first and third posts and then in a negative Y axis direction towards said third and fourth posts;

(d) reciprocation means coupled to said first and second winding means for synchronizing movement of said winding means such that said first winding means causes a portion of a coil winding to locate at a bottom region of the frame in line with the origin while said second winding means causes a portion of another coil winding to locate at a top region of the frame about the shaft; and

(e) computing means connected to said first and second winding means and s id reciprocating means for providing logic control signals for controlling the operation of said first and second winding means and said reciprocating means.

4,958,778

DEVICE FOR CONTINUOUSLY WINDING A WIRE-LIKE ELEMENT

Satoshi Tanaka, Kanagawa, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Jul. 11, 1989, Ser. No. 378,974
Claims priority, application Japan, Jul. 12, 1988, 63-171925
Int. Cl.[5] B65H *67/052*
U.S. Cl. 242—25 A **5 Claims**

1. A device for continuously winding a wire-like element comprising:

first and second bobbins on which the wire-like element is wound;

first and second cam plates movable towards the first and second bobbins respectively, at respective specified times for switching winding between bobbins;

first and second movable shafts supporting the first and second cam plates respectively;

means for urging each of the first and second shafts toward their respective bobbins so as to move the respective cam plates into contact with their respective bobbins so as to switch winding from one bobbin to the other; and

first and second trigger mechanisms associated with each movable shaft for limiting the movement of the shaft.

4,958,779

METHOD FOR RESTORING YARN CONTINUITY DURING BOBBIN WINDING, AND DEVICES FOR ITS IMPLEMENTATION

Luici Colli; Roberto Badiali, and Nereo Marangone, all of Pordenone, Italy, assignors to Savio S.p.A., Pordenone, Italy

Filed Sep. 19, 1988, Ser. No. 246,411
Claims priority, application Italy, Nov. 13, 1987, 22622 A/87
Int. Cl.[5] B65H *54/22*
U.S. Cl. 242—035.6 R **22 Claims**

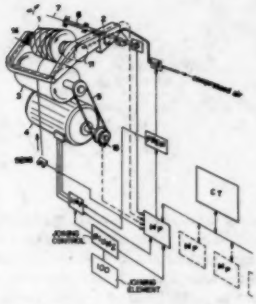
1. A method for winding yarn onto a rotating bobbin driven by a drive roller and supported by a carrier arm when the yarn feed is broken, comprising:

(a) restoring the broken yarn feed by means of an intervention cycle wherein said cycle has a first portion and a second portion wherein said first portion comprises the steps of:

(1) raising the rotating bobbin from the drive roller when the yarn feed is broken;

(2) braking the rotating bobbin and the drive roller independently until the bobbin stops rotating wherein the rotating bobbin is braked when it is raised from the drive roller; and

wherein said second portion comprises joining the broken yarn; and



(b) interposing a variable time delay between the commencement of said bobbin braking step of said first portion and the commencement of said joining step of said second portion of said intervention cycle by means of a timer device wherein said variable time delay is determined by the amount of yarn wound on the bobbin, wherein the amount of yarn wound on the bobbin is determined by; measuring the diameter of the bobbin by measuring the angular displacement of the carrier arm.

4,958,780

SPOOL DRIVING AND BRAKING

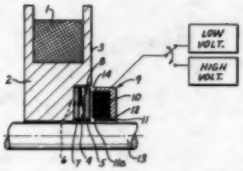
Rainer Bruenn, Esel; Rolf Heisterhagen, Hanover; Wolfram Klebl, Isernhagen, and Harry Staschewski, Langenhagen, all of Fed. Rep. of Germany, assignors to Kabelmetal Electro GmbH, Hanover, Fed. Rep. of Germany

Filed Apr. 10, 1989, Ser. No. 335,572

Claims priority, application Fed. Rep. of Germany, Apr. 9, 1988, 3811876

Int. Cl.[5] B65H *49/18, 54/44, 59/04*

U.S. Cl. 242—47 **5 Claims**



1. In combination with a spool upon which elongated stock such as ribbon, wire, thread etc.is to be wound and from which the elongated stock is to be unwound; an electromagnetic device including an electromagnet and a cooperating armature, further including a yoke that is part of the electromagnet, the device is to be used selectively as a brake and as a clutch, the improvement comprising:

a shaft connected to the electromagnet for rotation therewith, the spool being rotatably arranged around the shaft;

means for connecting the armature to the spool for rotation with the spool, while permitting axial displacement of the armature relative to the spool;

means defining a permanent, magnetically effective gap between said yoke and said armature to remain effective as a gap in the energized state of the electromagnet;

means for applying a first, predetermined and relatively high voltage to the electromagnet so that positive coupling obtains between the electromagnet and the armature and therefore between said shaft as connected to the electromagnet; and the armature as being connected to the spool, whereby rotation of the shaft rotates the spool, and

means for applying a second predetermined voltage, lower than the first voltage, to the electromagnet so that a brake force becomes effective between the electromagnet and the shaft on one hand, and the armature with the spool on the other hand.

4,958,781

CASSETTE FOR PHOTO-SENSISTIVE RECORDING MEDIUM

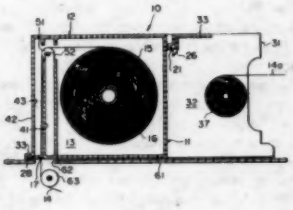
Masashi Ueda; Kazumasa Makino, both of Nagoya; Yumio Matsumoto, Kasugai; Akira Sago, Nagoya; Kiyoharu Hayakawa, Ama, and Osamu Takagi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Dec. 2, 1988, Ser. No. 279,445

Claims priority, application Japan, Dec. 15, 1987, 62-191007; May 30, 1988, 63-72826; May 30, 1988, 63-72827

Int. Cl.[5] G03B *1/04*

U.S. Cl. 242—71.7 **19 Claims**



1. A cassette for accommodating therein a photosensitive recording medium, said cassette comprising:

a pair of cassette halves formed of a synethetic resin, said pair of cassette halves being united together to form a rectangular parallelopiped cassette body having six walls and having defined therein an accommodating chamber for said recording medium;

a drawing opening formed in an outer surface of said cassette body, said recording medium being drawn out of said accommodating chamber through said drawing opening: and

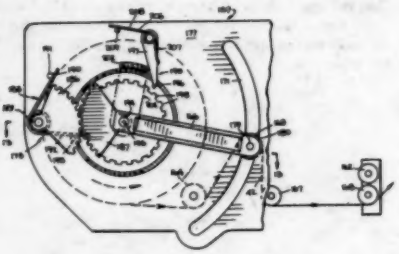
and optically inert, substantially straight feed passage defined by cooperation of a wall section of one of said pair of cassette halves with a wall section of the other of said pair of cassette halves when said cassette halves are united together, said wall sections forming one of said cassette body six walls, said feed passage having one end thereof communicating with said accommodating chamber and the other end communicating with said drawing opening such that said recording medium passes through said feed passage when said recording medium is drawn out of said accommodating chamber through said drawing opening.

4,958,782

REELED TAPE SUPPLY

Hugh S. Dannatt, Bethel; Thomas W. Alesi, Jr., New Fairfield, and Walter J. Kulpa, Trumbull, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 28, 1988, Ser. No. 291,480
Int. Cl.[5] B65H *23/06, 23/16*
U.S. Cl. 242—75.43 **10 Claims**



1. A tape supply for supplying tape under constant tension comprising:

means for mounting a reel of tape for rotation of said reel about an axis thereof as tape is withdrawn therefrom;

a lever mounted to pivot about said axis;

a surface mounted to an end of said lever so that tape withdrawn from said reel passes over said surface;

said lever being pivoted to move said surface in opposite directions transverse to said axis;

a torsion spring having a first end fixed against movement and a second end;

means coupling said second end of said spring to said lever such that:

(a) said spring urges said lever in a first of said opposite directions to apply tension to tape passing over said surface,

(b) said lever moves in a second of said opposite directions in response to an increase in tension on said tape, thereby torsioning said spring, and

(c) said lever moves in said first direction in response to a decrease in tension on said tape, thereby relieving said torsioning of said spring,

said coupling means, in a range of torsioning of said spring, compensating for the increase in torque produced by the torsioning of said spring, whereby said surface applies a constant tension to said tape in a given range of pivoted positions of said lever.

4,958,783

CABLE OR WIRE GUIDE FOR A GUIDE SYSTEM

Pascal Guichard, Autun, France, assignor to Alcatel N.V., Amsterdam, Netherlands

Filed Aug. 2, 1989, Ser. No. 388,959
Claims priority, application France, Aug. 3, 1988, 88 10484
Int. Cl.[5] B65H *57/00*
U.S. Cl. 242—157 R **2 Claims**

1. A guide for guiding a cable onto a reel along a normal advance axis lying in a guide plane perpendicular to a rotational axis defined by the reel, wherein the guide comprises:

first and second fixed shafts disposed symmetrically about said guide plane,

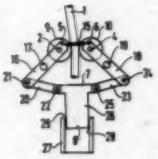
first and second rocker arms symmetrically configured with respect to each other and each having a first end and a second end, as well as an intermediate bearing rotationally mounted to a respective one of said fixed shafts

first and second rollers each carried at a respective first end of a respective one of said rocker arms

a spring connected between the two first ends of the rocker arms for urging said first ends towards each other,

a slideway symmetrically disposed with respect to said advance plane

a slide having a head portion and a tail portion, with the tail portion slidingly engaged with a small amount of play in the slideway so as to constrain said head portion to travel substantially along a slide axis lying in said guide plane,



first and second connecting rods symmetrically configured with respect to each other and each having a first end and a second end, with each said first end hinged to said head portion of the slide and with each said second end hinged to a respective second end of a respect said rocker arm,

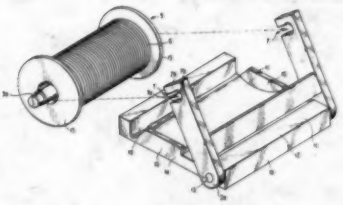
whereby the rollers remain symmetrically disposed about said guide plane and bear against any cable passing therebetween even if the cable is angularly offset relative to said guide plane, and the rollers are free to move apart from each other whenever an enlarged cable diameter is encountered.

4,958,784

COLLAPSIBLE SPOOL HOLDER FOR FISHING LINE

David Totten, 3125 S. Virginia, #3, Reno, Nev. 89502

Filed Aug. 31, 1989, Ser. No. 401,123
Int. Cl.[5] B65H *49/20*
U.S. Cl. 242—129.6 **5 Claims**



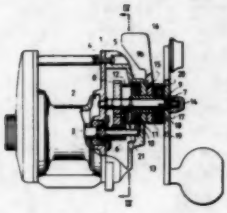
1. A collapsible spool holder comprising a planar base plate, a pair of pivot arms pivotably mounted at one end to said base plate at one end thereof for pivoting into upwardly oblique position, to respective opposite sides of said base plate, a shaft removably mounted to the ends of said arms remote from said pivot connection to said base, said shaft projectable through a hollow spool bearing fishing line for rotatably mounting said spool to the ends of said arms, and wherein said base plate includes a concave groove within the upper face thereof positioned to receive the spool and support the spool for rotation about its axis to facilitate unwinding of the fishing line from the periphery of the spool received within the concave groove under gravity influence causing the arms to rotate downwardly towards the base plate due to the weight of the spool and the fishing line thereon.

4,958,785

FISHING REEL DRAG MECHANISM

Atsuhito Aoki, Hiroshima, Japan, assignor to Ryobi Ltd., Hiroshima, Japan

Filed Nov. 16, 1988, Ser. No. 271,964
Claims priority, application Japan, Nov. 26, 1987, 62-180869
Int. Cl.[5] A01K *89/033*
U.S. Cl. 242—295 5 Claims



1. A fishing reel comprising:
a frame-like body;
a side cover attached to the frame-like body;
a spool shaft having opposite ends, being supported at both ends;
a spool supported by said spool shaft;
a pinion fitted on said spool shaft;
a master gear engaging the pinion and mounted on a master gear shaft, one end of said master gear shaft rotatably secured adjacent said frame-like body;
a handle for rotating said master gear shaft at an end of said master gear shaft opposite said frame-like body, the handle being spaced a predetermined distance away from said side cover;
a generally cylindrical bearing for supporting said master gear shaft, said generally cylindrical bearing including a flange portion;
a ratchet rotatably disposed on said cylindrical bearing;
drag control means for generating and controlling a reel braking force during unwinding of fishline wound on said spool, said drag control means including:
(a) a plurality of washer members for holding said ratchet between said cylindrical bearing and said side cover and for producing a frictional force therebetween;
(b) a control lever rotatably mounted on said cylindrical bearing for adjusting said reel braking force, said control lever comprising a first cam portion;
(c) a second cam portion disposed in opposing relationship to and engaging said first cam portion such that the frictional force produced by said washer members is adjusted by rotating said control lever;
(d) presetting nut threadably engaging said cylindrical bearing for adjusting the reel braking force on the spool, said presetting nut being disposed between said control lever and said handle and including a spring washer; and
(e) means for engaging said ratchet with said master gear.

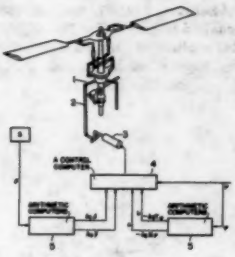
4,958,786

ACTIVE CONTROL MECHANISM FOR A HELICOPTER

Koji Ogawa, Ashiya, and Hikoichi Machida, Toyonaka, both of Japan, assignors to Sumitomo Precision Products Co., Ltd., Amagasaki, Japan

Continuation of Ser. No. 148,872, Jan. 27, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,695
Claims priority, application Japan, Feb. 3, 1987, 62-22784; Feb. 3, 1987, 62-22785
Int. Cl.[5] B64C *11/34*
U.S. Cl. 244—17.13 6 Claims

1. In a cyclic pitch control mechanism of a helicopter, an active control mechanism having a lower swash plate, comprising:
an actuator of the control mechanism;
means for providing a cyclic pitch control signal input;
means for providing a first signal proportional to the angular acceleration of an attitude angle θ of the helicopter;
means for providing a second signal compensatory to said first signal and proportional to a cyclic pitch control signal input Ψ of a pilot;



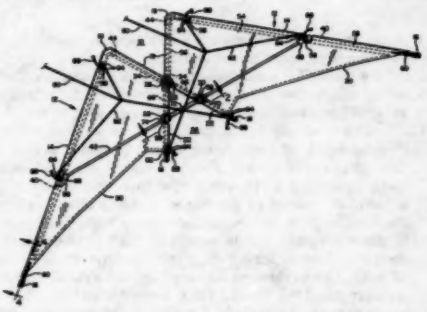
means for providing a third signal of the cyclic pitch control signal input Ψ of a pilot; and
said means for providing a cyclic pitch control signal input being responsive to said first, second and third signals for controlling said actuator and swash plate.

4,958,787

KITE

Duane M. Sterling, 213 NW. Couch St., Portland, Oreg. 97209

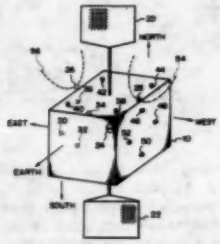
Filed Mar. 9, 1989, Ser. No. 321,290
Int. Cl.[5] A63H *27/08*
U.S. Cl. 244—153 R 9 Claims



1. A kite construction comprising:
a pair of identical wing sections,
frame means at the front of each wing section extending outwardly to a side tip at a rearwardly directed angle and forming leading edges for the kite;
said frame means also including a pair of inwardly disposed extensions leading rearwardly from respective leading edges at spaced points and at an angle to define the sides of a triangular space between said leading edges;
said pair of extensions extending across each other at an angle and forming two sides of a triangle in said frame means;
said frame means also including a laterally extending spreader bar connected to intermediate portions of the leading edge of said front frame means and crossing said pair of extensions to form a closed frame reinforcing triangle;
connectors securing said pair of extensions and said spreader bar together in triangular relation;

a sail portion on said kite fitted on said frame means and forming a trailing edge;
and bridle means arranged for attachment to a fly line.

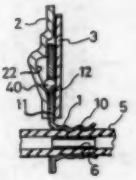
4,958,788
ORBIT CONTROL SYSTEM FOR A SATELLITE
Takakazu Namera, and Naoto Ogura, both of Tokyo, Japan, assignors to NEC Corporation, Japan
Continuation of Ser. No. 339,961, Apr. 18, 1989, abandoned, which is a continuation-in-part of Ser. No. 66,091, Jun. 24, 1987, abandoned. This application Oct. 16, 1989, Ser. No. 423,618
Claims priority, application Japan, Jun. 26, 1986, 61-150221
Int. Cl.[5] B64G 1/26
U.S. Cl. 244—169 **5 Claims**



1. A system for controlling orbit of a satellite which has a plurality of gas jet thrusters, comprising:
a sensing means for sensing an attitude of the satellite;
a setting means for setting up a predetermined evaluation value in response to an output of said sensing means;
OFF control means for turning OFF an orbital control thruster when, at least during a predetermined period of time after the initiation of orbit control, the evaluation value exceeds a given value of a threshold A which is sequentially varied to prevent an attitude error angle of the satellite from becoming excessively high; and
ON control means for turning ON said orbital control thruster when, at least during said predetermined period of time, the evaluation value after said orbital control thruster has been turned OFF becomes smaller than a given value of a threshold B which is sequentially varied to prevent an attitude error angle of the satellite from becoming excessively high.

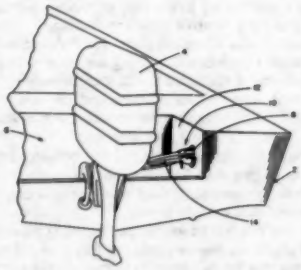
4,958,789
HOSE FITTING FIXING CONSTRUCTION
Terumitsu Shigeki, Nagoya, and Kenichi Mitsui, Ichinomiya, both of Japan, assignors to Toyoda Gosei Co., Ltd., Nishikasugai, Japan
Filed Mar. 14, 1989, Ser. No. 323,409
Claims priority, application Japan, Mar. 31, 1988, 63-43378; Jul. 5, 1988, 63-89367
Int. Cl.[5] F16L 5/00
U.S. Cl. 248—56 **13 Claims**

1. A hose fitting fixing construction comprising:
a hose fitting comprising a cylindrical sleeve for receiving a hose and a plate-shaped flange having an engagement dent defined therein, said flange extending radially from an outer peripheral surface of said sleeve;
a plate-shaped bracket extending from a mounting portion, said bracket defining an engagement space for slidably receiving said flange; and
an engagement member disposed in said engagement space of said bracket, said bracket, engagement space and engagement member being so constructed and arranged that said engagement member is disposed in said space so as to be movable therewithin but confined to said engagement



space, said engagement member being sized and shaped and disposed within said engagement space so as to be engagable with said engagement dent of said flange when said flange is inserted into said engagement space, thereby retaining said flange in said bracket by cooperative engagement of said engagement dent, engagement member and said bracket.

4,958,790
CABLE BOOT
Charles D. Nix, 1578 Slaughter Rd., Madison, Ala. 35758, and Johnny P. Baker, 782 Burwell Rd., Harvest, Ala. 35749
Filed May 5, 1989, Ser. No. 349,118
Int. Cl.[5] F16L 5/00
U.S. Cl. 248—56 **9 Claims**



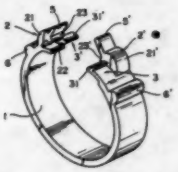
1. The combination comprising a panel separating first and second compartments of a structure, said panel including an annular edge defining a hole in communication with each of said compartments, a hollow boot mounted on said panel within said second compartment generally concentrically of said hole, said boot being adaptable to receive one or more cables or wires passing from said first compartment to said second compartment, said boot including a generally cylindrical body section, a base connected to a first end of said body section, and means on a second end of said body section for closing the boot tightly and snuggly around said one or more cables, hoses and/or wires, said means for closing said boot comprising a series of spaced slits in said second end of said body section and a drawstring interlaced between the walls of said slits.

4,958,791

TYING MEANS

Toshinobu Nakamura, Tokyo, Japan, assignor to Shinagawa Shoko Co., Ltd., Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,247
Int. Cl.[5] F16L 3/08
U.S. Cl. 248—74.1 9 Claims



1. A belt-like clamping device comprising a belt-like annular member having a first and second proximal end, each proximal end having an outward-facing engaging hook and an inward-facing receiving hook laterally juxtaposed to a respective outward facing engaging hook, said inward-facing receiving hooks comprising raised upper members, so that when the first proximal end is brought into engagement with the second proximal end:

the outward-facing engaging hook of the first proximal end engages the inward-facing receiving hook of the second proximal end and

the outward-facing engaging hook of the second proximal end engages the inward-facing receiving hook of the first proximal end and

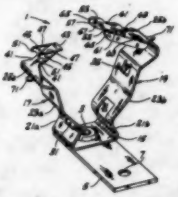
said raised upper members of said inward-facing receiving hooks being laterally juxtaposed to prevent lateral movement of the first and second proximal ends when said ends are engaged.

4,958,792

CLIP FOR SUPPORTING CONDUIT AND THE LIKE

Eric R. Rinderer, Highland, Ill., assignor to B-Line Systems, Inc., Highland, Ill.

Filed May 9, 1989, Ser. No. 349,254
Int. Cl.[5] F16L 3/08
U.S. Cl. 248—74.2 19 Claims



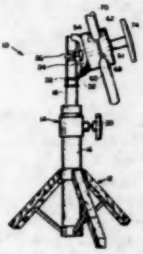
1. A clip for supporting conduit and like members, comprising a base and first and second resilient arms extending outwardly from the base for holding a conduit or like member therebetween, said arms having outer end portions bent to extend generally toward one another, said arms being resiliently biased toward a release position in which they are spaced apart and being resiliently movable against said bias to a first support position in which the arms are closer together with their outer end portions in overlapping relation and with the arms in position to embrace a conduit or like member of a first diameter, and from said first support position to a second support position in which the arms are even closer together with their outer end portions in overlapping relation and with the arms in position to embrace a conduit or like member of a second diameter smaller than said first diameter, the outer end portion of said first arm having detent means thereon, the outer end portion of the second arm being formed and configured at a first location for engagement by said detent means to releasably lock the arms in said first support position and formed and configured at a second location for engagement by said detent means to releasably lock the arms in said second support position, and means for restricting movement of the arms as they move toward one another from said first support position to said second support position to movement wherein said detent means moves along a path from said first location to said second location, said restricting means being so formed as to prevent said detent means from deviating from said path even if the arms are subjected to forces tending to cause deviation of said detent means from said path.

4,958,793

STANCHION

Norman B. Hess, 12611 Neon Way, Granada Hills, Calif. 91344

Filed May 1, 1989, Ser. No. 345,281
Int. Cl.[5] F16M 13/00
U.S. Cl. 248—122 9 Claims



1. A stanchion supporting a structure in a spaced relationship above a supporting surface in an established position, said stanchion comprising:

a base adapted to be located on a supporting surface;

a longitudinally adjustable tube assembly mounted on said base, said longitudinally adjustable tube assembly terminating at an upper end;

a universal joint mounted on said upper end, said universal joint including a clamping rod, said clamping rod engaging with said longitudinal adjustable tube assembly, said clamping rod being pivotable within a horizontal plane extending transverse to said longitudinal adjustable tube assembly;

said universal joint including a pair of clamp members, said clamp members being pivotally mounted on said clamping rod;

a mounting rod located between said clamp members, said mounting rod being movable within a substantially vertical plane, the structure being adapted to be mounted on said mounting rod;

a ball member mounted on and carried by said clamping rod, said ball member located between said longitudinally adjustable tube assembly and said clamp members, said ball member being mounted on said longitudinally adjustable tube assembly, said ball member having a spherical exterior surface, said clamp members being mounted on said spherical exterior surface, said clamp members being moved in said horizontal plane along with said clamping rod, said clamp members being movable on said spherical exterior surface, said universal joint including a means for permitting limited tilting movement of said clamping rod and said clamp members as well as said mounting rod relative to said horizontal plane; and

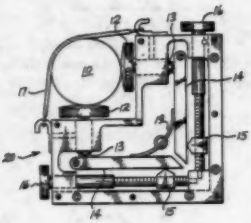
a handle mounted on said clamping rod, said handle to be movable between a loosened position and a tightened position, with said handle in said loosened position said clamping rod being movable within said horizontal plane and said mounting rod being movable within said vertical plane and said clamping rod being tiltable, with said handle in said tightened position said mounting rod being fixedly located.

4,958,794

DUAL PURPOSE ALIGNMENT BRACKET FOR USE WITH LASER OR OPTICAL SCOPE

Richard A. Brewer, Buckley, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Feb. 1, 1989, Ser. No. 305,242
Int. Cl.[5] G02B 7/00
U.S. Cl. 248—183 1 Claim



1. An alignment bracket assembly (20) for use with an instrument (10), said alignment bracket assembly (20) comprising in combination:

means (17) for securing said instrument (10) against a pair of coarse adjustment screws (12);

a pair of sine bars (14);

a pair of coarse adjustment sockets (13);

said pair of coarse adjustment sockets (13) disposed against said pair of sine bars (14);

said pair of coarse adjustment screws (12) threaded into said pair of coarse adjustment sockets (13);

a pair of wedge elements (15);

a pair of fine adjustment screws (16); and,

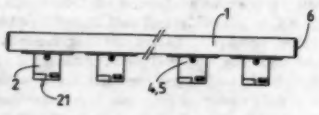
said pair of sine bars (14) pivotally disposed and cooperative with said wedge elements (15) translatable by means of said fine adjustment screws (16) through coarse adjustment screws (12).

4,958,795

FITTING FOR THE SORTING OF PLANS IN A VERTICAL FILING CABINET

Alain Bruneau, Montferrand Le Chateau, France, assignor to Alpia S.A., Besancon, France

Filed Jun. 13, 1989, Ser. No. 365,492
Claims priority, application France, Jun. 30, 1988, 88 09105
Int. Cl.[5] A47H 1/10
U.S. Cl. 248—317 10 Claims



1. A fitting for sorting of plans in a vertical filing cabinet with suspension pins, comprising:

a tubular profiled member (1) with a support tenon (12) extending downwardly;

a plurality of teeth (2), each tooth (2) consisting of two half teeth, each half tooth including an opening (35) and a corresponding coupling tenon (36), said opening and said coupling tenon cooperating to interlock the two half teeth, with the coupling tenon of one tooth being disposed in the corresponding opening of the other half teeth; and

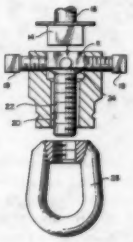
means (4,5) for fastening said teeth to said support tenon by urging said half teeth toward each other.

4,958,796

COUPLING OR CONNECTOR FOR SECURING A LOAD-BEARING SUPPORT TO A HEAD OF A BOLT

John Bernosky, Rte. 1, Box 247A, Mt. Morris, Pa. 15349

Filed Oct. 12, 1989, Ser. No. 420,312
Int. Cl.[5] F16L 3/00
U.S. Cl. 248—317 17 Claims



1. A coupler or connector body for heavy load-bearing supports which comprises:

a body having an upper portion and a lower portion,

an axially aligned opening in said upper portion of said body having a size compatible with a bolt head to which said coupler is to be secured, and

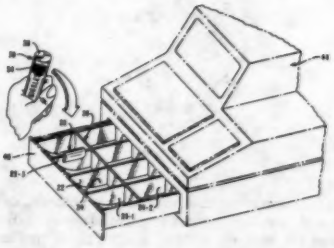
at least one pair of oppositely disposed radially directed threaded bolts or screws that pass through radially directed threaded holes in said upper portion of said body to said axially aligned opening therein to secure said coupler to said bolt head.

4,958,797

COIN ROLL BREAK DEVICE FOR PROTECTING A TRAY WALL OF A COMPARTMENT OF A TILL TRAY

Dale R. Lyons, Buford, Ga., assignor to NCR Corporation, Dayton, Ohio

Filed Jun. 7, 1989, Ser. No. 363,028
Int. Cl.[5] A47B 88/00
U.S. Cl. 248—345.1 5 Claims



1. A till tray for use in a cash drawer of a business machine, said till tray comprising:

at least one compartment with each compartment having a tray wall and with each tray wall having first and second opposed surfaces and an upper exposed edge joining said first and second opposed surfaces; and

protection means mounted on said upper exposed edge of said tray wall of one of said at least one compartment which facilitates the breaking of a coin roll having a wrapper thereon and protecting said tray wall from damage when a user breaks open said coin roll by impacting said coin roll against said protection means;

said protection means including a generally U-shaped body

having a first leg portion, a second leg portion, and a joining portion having a striking surface joining said first and second leg portions, said striking surface being substantially rigid for breaking the wrapper of the coin roll when the coin roll is impacted thereagainst;

said first leg portion and said second leg portion being resiliently biased towards each other so as to accommodate tray walls of varying thicknesses and to facilitate said protection means gripping said first and second opposed surfaces when said protection means is mounted on said upper exposed edge; and

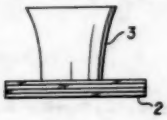
said first leg portion and said second leg portion each having a plurality of grippers thereon which become operatively engaged with the first and second opposed surfaces of said tray wall when said protection means is mounted on the upper exposed edge of said tray wall.

4,958,798

COCKTAIL NAPKIN

Julie W. Parker, 2379 Neil Ave., Columbus, Ohio 43202

Filed Jul. 10, 1986, Ser. No. 884,022
Int. Cl.[5] A47G *11/00*
U.S. Cl. 248—346.1 **4 Claims**



1. A cocktail napkin adapted to serve as a coaster for a cocktail glass,

said napkin comprising a body of absorbent paper with an upper porous surface of water repellant material which when the base of a cocktail glass is rested thereon conducts condensed moisture from said base into said absorbent body and prevents the formation of a layer or film of water between said base and the napkin and thereby prevents sticking of the napkin to said base.

4,958,799

SEAT TRACK LATCH ANTI-RATTLE RELEASE WIRE

Mitchell J. Clauw, Sterling Heights; Neal G. Stupera, Fraser; Theodore W. Tobin, and Dennis M. Viscome, both of Taylor, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Dec. 18, 1989, Ser. No. 451,902
Int. Cl.[5] F16M *13/00*
U.S. Cl. 248—430 **1 Claim**

1. A vehicle seat support mechanism for support a seat on a vehicle so that the position of the seat is adjustable fore and aft, comprising:

laterally spaced first and second parallel track assemblies mounting the seat on the vehicle for longitudinal movement to a plurality of fore and aft adjusted positions;

said first track assembly including a first lower guide rail mounted to the vehicle and a first upper slide rail slidable on said first lower guide rail to the fore and aft positions and a second lower guide rail mounted to the vehicle and a second upper slide rail slidable on said second lower guide rail to the fore and aft positions;

a first latch member which locks said first slide rail to said first guide rail when said first latch member in a lock position, and unlocks said first slide rail so that said first slide rail is slidable relative to said first guide rail when said first latch member is in an unlock position;

a second latch member which locks said second slide rail to said second guide rail when said second latch member is in a lock position, and unlocks said second slide rail so that said second slide rail is slidable relative to said second guide rail when said second latch member is in an unlock position;

an operating bar being connected with said first latch member so that said first latch member can be moved to the unlock position by said operating means,

a transversely extending release wire connected between said operating bar and said second latch member, for transmitting motion from said operating bar to said second latch means so that said second latch means is moved to the unlock position together with said first latch means by movement of said operating bar,

said release wire having identical hair-pin connectors integrally formed at each end thereof, each said connector formed a return-bend enlarged loop portion adapted for hooked engagement with aperture means in an associated first and second latch plate for simultaneous operation of said first and second latch members each said loop portion terminating on a linear resilient tail portion formed with a raised bump, each said tail portion normally defining an acute angle with said release wire, and a pair of retainer members slidably disposed on said wire whereby each of said retainer members adapted to capture a tail portion of its associated connector upon the tail portion being flexed juxtaposed said release wire, and whereby each said hair-pin connector lying on a common plane that includes said release wire, the improvement wherein,

said first track assembly latch plate having a disk-shaped upstanding portion lying in a longitudinally extending plane sloped upwardly and toward said second track assembly,

said disk-shaped portion having a central connector hole therein, said disk-shaped portion defining a semi-circular periphery concentric with said central hole, said disk-shaped portion formed with a radial upwardly opening notch therein at an upper and outermost point along its periphery,

said second track assembly latch plate having a transversely extending, vertically disposed connector flange extending toward said first track assembly, said connector flange having a connector hole oriented with its principal axis disposed longitudinally and parallel with the second track assembly;

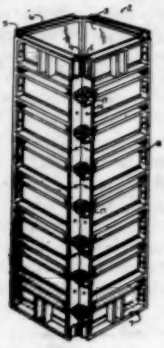
whereby upon said one hair-pin connector being connected in a generally vertically oriented manner to said disk-shaped portion with the release wire linear portion nested in said radial notch and its tail portion extending through said disk-shaped portion central opening, such that said other hair-pin connector being connected in a generally horizontally oriented manner to said connector flange hole thereby imparting a predetermined twisting torque of substantially 90° in said release wire so as to resiliently bias each said connector into positive contact with its associated track assembly mounting providing a rattle-free attachment of each said hair-pin connector.

4,958,800

LOCKING HINGE MECHANISM

Michael G. Carlson, Lenexa, Kans., assignor to Western Forms, Inc., Kansas City, Mo.

Filed Jul. 6, 1989, Ser. No. 376,318
Int. Cl.[5] E05D *11/10*; E04G *17/04*
U.S. Cl. 249—219.1 **6 Claims**



1. A locking hinge mechanism for concrete forms comprising:

a. first and second parallel hinge strips respectively having means for attachment to side rails of adjoining concrete forms;

b. each of said hinge strips having confronting beveled edges at a selected angle for establishing a closed angular relationship of said hinge strips when swung together;

c. a plurality of hinge means offset from said beveled edges and connecting said hinge strips together; and

d. each said hinge means including means for wedging said hinges means together to swing said hinge strips together and exerting increasing compressive force on said confronting beveled edges as said means for wedging is advanced, said means for wedging said hinge means affixing said hinge strips to said closed angular relationship.

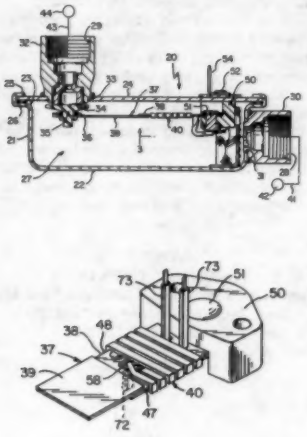
4,958,801

VALVE CONSTRUCTION AND METHOD OF MAKING THE SAME

Harvey J. Shopsky, Latrobe, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Sep. 19, 1989, Ser. No. 409,243
Int. Cl.[5] F16K *31/70*, *31/02*
U.S. Cl. 251—11 **10 Claims**

1. In a valve construction comprising a housing means provided with a chamber therein and with an inlet leading to said chamber and an outlet leading from said chamber, a valve seat carried by said housing means and leading to said outlet, a movable bimetallic lever means carried by said housing means and having an operating bimetallic part, a heater wire means disposed in coiled relation about said operating part to heat the same when an electrical current flows through said heater wire means, and a valve member carried by said bimetallic lever means for opening and closing said valve seat under the control of said operating part of said bimetallic lever means, said operating part of said bimetallic lever means having a fastening means operatively interconnected to said heater wire means to tend to hold said heater wire means in said coiled relation on said operating part of said bimetallic lever means, said heater wire means comprising a length of said wire means doubled upon itself to define a looped end and a pair of free ends adjacent each other with said looped end being said part of said heater wire means that is operatively interconnected to said fastening means of said bimetallic lever means, the improvement wherein said operating part of said bimetallic lever means has an opening means passing therethrough and receiving said



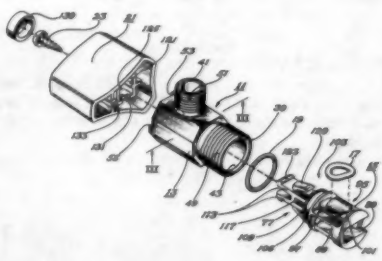
looped end of said wire means therethrough whereby said opening means comprises said fastening means of said operating part of said bimetallic lever means.

4,958,802

STOP VALVE

David T. Underwood, Richardson, Tex., assignor to United States Brass Corporation, Plano, Tex.

Filed Apr. 7, 1988, Ser. No. 178,475
Int. Cl.[5] F16K *5/04*
U.S. Cl. 251—310 **3 Claims**



1. A plumbing valve, comprising:

a metal valve body having first and second ends and a cylindrical cavity which has a side wall and a first end wall, said first end wall having an opening for receiving a portion of a valve stem, with said valve body having an inlet opening communicating with said cylindrical cavity and a cylindrical outlet opening communicating with said cylindrical cavity, said outlet opening having a side wall which intersects said cylindrical cavity side wall, said intersection of said outlet opening side wall and said cylindrical cavity side wall being chamfered;

said valve stem having a handle portion and a cylindrical cavity portion, said cylindrical cavity portion of said valve stem being located in said cylindrical cavity such that said valve stem protrudes from said cylindrical cavity

through said first end wall opening wherein said handle portion is adapted to coact with handle means, said valve stem being made of plastic and being rotatable so as to move between open and closed positions, said cylindrical cavity portion having stem seal means for sealing around said valve stem adjacent to said first end wall opening and outlet seal means for sealing off said outlet opening from said inlet opening when said valve stem is in the closed position, said outlet seal means comprising a seal ring, said valve stem having a passage that allows communication between said inlet and outlet openings when said valve stem is in the open position, wherein when said valve stem is moved to and from the closed position, said outlet seal ring means is moved across said intersection of said outlet opening and said cylindrical cavity in a contiguous manner;

said stem seal means comprises an O-ring having an inside diameter and said valve stem cylindrical cavity portion further comprises stem O-ring retainer means, said stem O-ring retainer means comprising: a cylindrical surface which is coaxial with the axis of rotation of said valve stem and which receives the stem O-ring; a shoulder portion positioned adjacent to said cylindrical surface and sized to so as to retain said stem O-ring on said cylindrical surface; and a flange portion positioned adjacent to said cylindrical surface such that said cylindrical surface is interposed between said shoulder portion and said flange portion, said flange portion having a diameter that is slightly larger than the inside diameter of said stem O-ring such that said stem O-ring is assembled onto the stem cylindrical surface by way of said flange portion without said stem O-ring being unduly stretched as it passes over said flange portion;

said flange portion being positioned with respect to said cylindrical surface so that when water pressure is applied to said value, said stem O-ring will be forced toward said flange portion, said flange portion having an inclined surface that is contiguous with said cylindrical surface, wherein said inclined surface forces said stem O-ring outwardly when said stem O-ring is forced toward said flange portion.

4,958,803

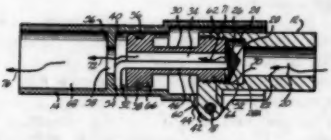
AUTOMATIC FLUID VALVE

Gilmore H. Chappell, 407 S. Almonesson Rd., Depford, N.J. 08096

Continuation-in-part of Ser. No. 97,132, Sep. 16, 1987, abandoned, and a continuation-in-part of Ser. No. 263,958, Oct. 26, 1988, Pat. No. 4,895,468, which is a continuation of Ser. No. 45,323, May 4, 1987, abandoned, and a continuation-in-part of Ser. No. 282,987, Dec. 2, 1988, abandoned, which is a continuation of Ser. No. 165,636, Mar. 8, 1988, abandoned, and a continuation-in-part of Ser. No. 163,066, Mar. 2, 1988, abandoned, and a continuation-in-part of Ser. No. 163,065, Mar. 2, 1988, Pat. No. 4,361,156. This application Feb. 6, 1989, Ser. No. 307,004

Int. Cl.[5] F16K *51/00*

U.S. Cl. 251—342 **56 Claims**



1. A fluid valve comprising:

a fluid conduit having a first end and a second end;

a baffle within the conduit between the first and second ends having a first face oriented towards the first conduit end and a second face oriented towards the second conduit end;

a baffle seat within the conduit between the baffle and the second conduit end arranged so that when the second baffle face rests against the seat, fluid flow from the first conduit end to the second conduit end through the conduit is substantially blocked; and

an operating element between the baffle and the second conduit end having a baffle end within the conduit and an operating end, the baffle end of the operating element being movable relative to the baffle and operative for separating the baffle from the baffle seat.

4,958,804

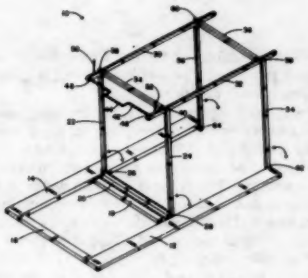
LAWN MOWER SERVICE LIFT

Robert R. Lenius, 1524 Weise, Green Bay, Wis. 54302, and Steven M. Bariament, 1836 Leawood Ave., Green Bay, Wis. 54313

Filed Jun. 7, 1989, Ser. No. 362,588

Int. Cl.[5] B66F *3/00*

U.S. Cl. 254—120 **1 Claim**



1. A lawn mower service lift, comprising:

an open ended rectangular base frame formed by two parallel side rails connected by a transverse end rail and an intermediate transverse support rail;

a rectangular support frame;

a pair of vertically upstanding stop members secured adjacent one end of said support frame for positioning a lawn mower thereon;

four struts each having a first end pivotally connected adjacent a corner portion of said support frame and a second end pivotally connected to said base frame, said four struts forming a parallelogram linkage and mounting said support frame for movement through said open end of said base frame between raised and lowered positions;

said support frame lying between said parallel side rails of said base frame in said lowered position, said base frame side rails spaced apart a predetermined distance to form a guide track for alignment of a lawn mower on said support frame;

an upstanding transverse stop rail secured between two of said four pivotal struts, said stop rail dimensioned to abut said intermediate transverse support rail in an over center position to maintain said support frame in said raised position;

and

a handle pivotally secured to said support frame for movement about a pivot axis parallel to pivot axes of each of said four pivotal struts, to facilitate manual movement of said support frame between said raised and lowered position.

4,958,805

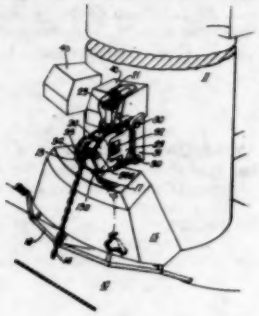
WINDLASS FOR OFFSHORE STRUCTURES

Robert Willamsson, Västra Palmgrensgatan 75, S-42177 Västra Frölunda, Sweden

Continuation of Ser. No. 192,006, May 9, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 443,021

Int. Cl.[5] B63B *21/16*; B66D *1/72*

U.S. Cl. 254—332 **6 Claims**



1. In an offshore platform or the like adapted to be anchored in the sea and providing therewith an operating water line (OD), the combination comprising:

(a) a platform deck support leg (11) extending through said operating water line when the platform is anchored,

(b) a chain storing box (15) mounted exteriorly of said leg and adapted to be submerged below said operating water line, and with said box being filled with water so as not to contribute to the boyancy of said offshore platform,

(c) a chain wheel (13) disposed above said box and rotatable about a horizontal mount and adapted to receive an anchor chain (14) extending from said box,

(d) means (29) mounting said chain wheel to the exterior of said leg so that said chain wheel is submerged below said operating water line and so that an anchor chain extending between said storing box and chain wheel is disposed below said operating water line,

(e) a vertical shaft (22) disposed adjacent said chain wheel below said operating water line,

(f) said mounting means (d) including a wheel housing (24) mounting said chain wheel for pivotal movement about said vertical shaft,

(g) and at least partially submerged drive means to rotate said chain wheel (13) about said horizontal mount.

4,958,806

SNOWSTORM GUARD FENCE STRUCTURES AND JET ROOFS

Akira Sato, and Masatoshi Ono, both of Niigata, Japan, assignors to Nihon Samicon Co., Ltd., Japan

Filed Dec. 14, 1988, Ser. No. 284,310

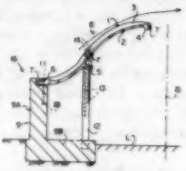
Int. Cl.[5] E01F *7/02*

U.S. Cl. 256—12.5 **14 Claims**

5. A snow fence to be disposed along the side of a road and the like, comprising:

an L-shaped substructural pile having a forward horizontal part, a rearward horizontal part, an upper vertical part, and a lower vertical part, said forward horizontal part being closest to the road;

a principal beam, having a top face and a bottom face, a forward edge and a rearward edge, and a center, said bottom face having a rib disposed from said forward edge to said rearward edge, binder parts at said forward and said rearward edges, and between said center and said forward edge, and also between said center and said rearward edge, being fixedly attached at said rearward edge to said upper vertical part of said L-shaped substructural pile, with a generally upward slope and with a section extending from said binder part located between said center and said forward edge to said binder part located at said forward edge having a slight downward arc, and extending to near middle of the road; and,



a pole having upper and lower ends, said lower end being buried in said forward horizontal part of said L-shaped substructural pile and said upper end being fixedly attached at said center of said principal beam through said rib.

4,958,807

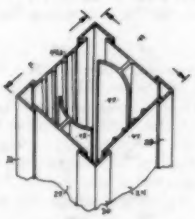
DECORATIVE POSTS FOR CROWD CONTROL

Glenn J. Wylie, 81 Kelfield Street, Unit 5, Rexdale, Ontario, Canada N9W 5H3

Division of Ser. No. 854,445, Apr. 21, 1986, Pat. No. 4,854,548. This application Jul. 27, 1989, Ser. No. 386,390

Int. Cl.[5] E04H *17/14*

U.S. Cl. 256—65 **4 Claims**



1. A rail structure, said rail structure comprising a rectangular extruded member,

at least a pair of inwardly extending locking means extending from opposing walls of said extruded member,

a plurality of parallel, longitudinally extending, inwardly directed wedge shaped locking means on at least a pair of said inwardly extending locking means,

wherein each of said inwardly extending locking means comprises a "U" shaped channel forming member having its base parallel to the wall from which it extends and its side walls extending inwardly from the walls of said rectangular member, said wedge shaped locking means being spaced on said base of said "U" shaped channel forming member.

4,958,808

APPARATUS FOR PRODUCING SPONGE IRON OR PIG IRON

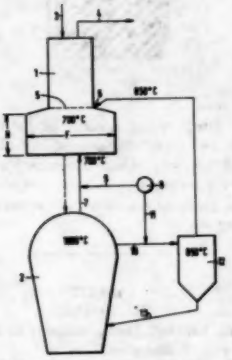
Rolf Hauk, Düsseldorf, Fed. Rep. of Germany, assignor to Deutsche Voest-Alpine Industrieanlagenbau GmbH, Düsseldorf, Fed. Rep. of Germany

Division of Ser. No. 6/786,691, Oct. 11, 1985, Pat. No. 4,854,967. This application May 1, 1989, Ser. No. 345,882

Claims priority, application Fed. Rep. of Germany, Oct. 12, 1984, 3437913

Int. Cl.[5] F27B *1/02*

U.S. Cl. 266—154 4 Claims



1. An apparatus for producing sponge iron from iron ore comprising: a melt-down gasifier or coal-to-gas plant, a shaft furnace having a top portion of a first cross section, an inlet in said top portion for introducing iron ore thereinto and an outlet for removing top gas therefrom; a base portion of a second cross section larger than said first cross section and having an outlet for sponge iron; a bustle plane between said top and base portions; first means at said bustle plane for introducing a first quantity of reducing gas containing CO from said melt-down gasifier or coal-to-gas plant into said furnace with a first temperature of from 750° to 900° C.; second means connected to said base portion for introducing thereinto a second quantity of reducing gas containing CO also from the gasifier or coal-to-gas plant with a second temperature in a range of from 650° C. to 750° C. at said second temperature CO being separated into carbon and carbon dioxide to thereby carbonize iron ore in said base portion to form sponge iron.

4,958,809

LIQUID METAL LAUNDER

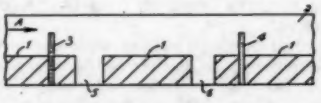
Patrick P. Wai, and Steven Rogers, both of Banbury, England, assignors to Alcan International Limited, Montreal, Canada

Division of Ser. No. 187,270, Apr. 28, 1988. This application Aug. 2, 1989, Ser. No. 388,436

Claims priority, application United Kingdom, Apr. 28, 1987, 8709999

Int. Cl.[5] C21C *1/00*

U.S. Cl. 266—229 10 Claims



1. A liquid metal launder comprising a horizontal base and side walls providing a confined flow path for flow of liquid metal therealong;

flow restricting means extending upwardly from and across the flow path to resist the flow of molten metal therealong; and

a particle receptacle at a predetermined distance downstream of said flow resisting means,

the arrangement comprising means for shedding of vortices downstream of the flow restricting means so that particles having a predetermined range of thermal velocities are agglomerated into clusters of particles for deposition in the receptacle.

4,958,810

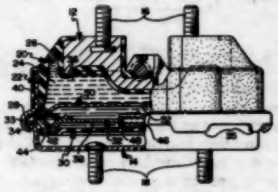
HYDRAULIC ENGINE MOUNT WITH DOMED ORIFICE PLATE

Thomas P. Gold, W. Chester; James P. Hamberg, Beavercreek; Darren K. Maness, Dayton, and Richard A. Muzechuk, Kettering, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 7, 1989, Ser. No. 390,307

Int. Cl.[5] F16F *9/34*

U.S. Cl. 267—140.1 3 Claims



1. A hydraulic mount assembly, comprising:

a pair of mounting members;

a hollow body connected to said mounting members;

a resilient diaphragm closing said hollow body and forming therewith a closed cavity that is filled with liquid;

means for partitioning said cavity into a primary chamber and a secondary chamber enclosed by said diaphragm;

an orifice track in said partitioning means connecting said chambers so as to effect damping;

an orifice plate spaced from and coextensive with said partitioning means and spanning said primary chamber;

an orifice of fixed size in said orifice plate in series communication with said orifice track for passively reducing the liquid flow between said chambers at higher operating frequencies so as to reduce dynamic rate.

4,958,811

HYDRAULICALLY DAMPING ELASTIC BEARING

Heinz Brenner, Ahrweiler, and Horst Reuter, Oberbachem, both of Fed. Rep. of Germany, assignors to Boge AG, Eltorf, Fed. Rep. of Germany

Filed May 26, 1989, Ser. No. 358,393

Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818287

Int. Cl.[5] F16F *5/00*

U.S. Cl. 267—140.1 4 Claims

1. A hydraulically damping elastic bearing comprising:

an outer tubular member;

an inner tubular member disposed radially inwardly of said outer tubular member to be separated therefrom;

an elastic member disposed between said inner tubular member and said outer tubular member;

said elastic member having at least one chamber filled with a damping medium;

at least one elastic radial stop means mounted to extend at

least partially between said outer tubular member and said inner tubular member;

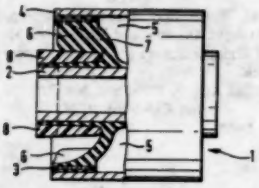
said at least one elastic radial stop means being disposed outside of and displaced from said chamber of said elastic member;

said outer tubular member and said inner tubular member having corresponding first ends and corresponding second ends;

said at least one elastic radial stop means being disposed at at least one of said first ends and said second ends;

said at least one elastic radial stop means extending from said outer tubular member toward said inner tubular member;

said at least one elastic radial stop means including an extended end which is radially spaced from said inner tubular member by a predetermined radial distance; and



said bearing further including wedge means disposed between said extended end of said at least one elastic radial stop means and said inner tubular member, wherein said wedge means is selectively removable and includes a radial height, said radial height is selected to be at least one of greater than said predetermined radial distance and less than said predetermined radial distance, said radial height being greater than said predetermined radial distance causes said at least one elastic radial stop means to be resiliently deformed by said wedge means to produce a radial force on said inner tubular and said outer tubular member, and said radial height being less than said predetermined radial distance is for limiting a movement of said extended end of said at least one elastic radial stop means toward said inner tubular member prior to any resilient deformation of said at least one elastic radial stop means.

4,958,812

SUSPENSION SPRING SYSTEM

Franz J. Wolf, and Hubert Pletsch, both of Bad Soden-Salmünster, Fed. Rep. of Germany, assignors to WOCO Franz-Josef Wolf & Co., Fed. Rep. of Germany

PCT No. PCT/EP87/00660, § 371 Date Jun. 28, 1988, § 102(e) Date Jun. 28, 1988, PCT Pub. No. WO88/03618, PCT Pub. Date May 19, 1988

PCT Filed Nov. 3, 1987, Ser. No. 223,083

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1986, 3637294

Int. Cl.[5] F16F *3/08*

U.S. Cl. 267—294 **25 Claims**

11. A suspension spring system comprising:

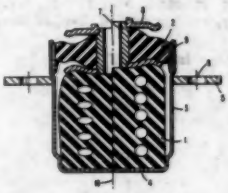
a housing;

a load supporting member at least partially positioned within said housing and movable with respect to said housing;

a suspension spring located in said housing, said suspension spring comprising a soft rubber spring having a plurality of cavities located therein, said suspension spring being compressible in an axial direction; and

disc-shaped bistable control spring means located in said housing for influencing and controlling the spring characteristics of said suspension spring, said disc-shaped bistable control spring means comprising at least one pressure spring, said disc-shaped bistable control spring means being radially compressed within said housing so as to be pre-stressed, said disc-shaped bistable control spring means being shiftable between two different final positions in response to movement of said load supporting member, both of said final positions being stable and being located along the axis of compression of said suspension spring; and

at least one end stop means associated with said disc-shaped



bistable control spring means for limiting an effective spring stroke of said disc-shaped bistable control spring means, said end stop means comprising a disc attached to said load supporting member and extending in a direction transverse to the direction of compression of said suspension spring.

4,958,813

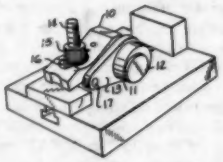
DIE CLAMP

Henry Dykstra, Milford, Mich., assignor to Delaware Capital Formation, Inc., Wilmington, Del.

Filed Sep. 28, 1989, Ser. No. 413,700

Int. Cl.[5] B23Q *3/08*

U.S. Cl. 269—32 **12 Claims**



1. Power clamp for mounting on T-slotted support surface comprising clamp arm with clamping end, intermediate adjustable T-bolt fulcrum means for anchoring said clamp arm to said support surface at adjustable clamping levels, and hydraulic cylinder fluid power actuated piston with ramp surface means for reacting against said support surface to raise the other arm end and thereby effect clamping engagement with a member interposed between said clamping end and said support surface, including locking pin extending longitudinally of said clamp arm interposed between said other arm end and said piston.

4,958,814

INTERVAL LOCATOR

Brian A. Johnson, 519 Green St., Perry, Mich. 48872

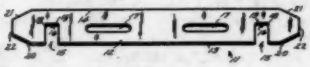
Filed Oct. 13, 1989, Ser. No. 420,889

Int. Cl.[5] B25B *3/00*; E04G *21/18*; G01C *5/00*

U.S. Cl. 269—43 **5 Claims**

1. An interval locator for building components comprising: an elongate, relatively flat, thin and rigid integral planar plate and two or more notches further comprising a base; said notches being on one of the elongate edges of said plate in relatively regular intervals each of said notches having a hardened punch point extending from the base and centered on said

base of each of said notches in a planar attitude with said plate; and at least one integral opening through said plate defining a



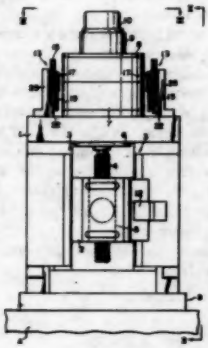
hand grip means; and said punch points defining interval center location points for adjacent building components.

4,958,815

TABLE EQUIPMENT

Katsunobu Ueda, and Mitsuo Sumiya, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jan. 23, 1989, Ser. No. 300,596
Claims priority, application Japan, Feb. 2, 1988, 63-21214
Int. Cl.[5] B23Q *3/18*
U.S. Cl. 269—58 **7 Claims**



1. Table equipment having a table for supporting an object to be positioned accurately and in short time cycles, comprising:

a frame;

a table for supporting an object, and movable relative to said frame;

a guide for guiding said table on said frame, in a line inclined to the horizontal plane;

a power source for driving said table along said guide;

connecting means for drivingly connecting said driving power source with said table; and

means for applying to said table a force to counterbalance said table and said object supported thereon and including a counterweight lighter than the total weight of said table and said object supported thereon;

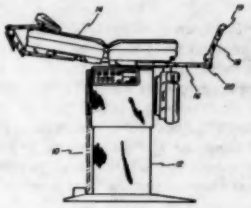
said frame having a vertical fluid chamber means for dampening the vibration generated by the force applying means, including, mounted on said frame containing a viscous fluid for movingly receiving said counterweight, thereby causing said table to move smoothly.

4,958,816

STIRRUP ASSEMBLY FOR EXAMINATION TABLE

David B. Chaney, Powell; John H. Oldiges, Minster, and Bart L. Milbourn, Versailles, all of Ohio, assignors to Midmark Corporation, Versailles, Ohio

Filed Nov. 20, 1989, Ser. No. 438,383
Int. Cl.[5] A61G *13/00*
U.S. Cl. 269—328 **14 Claims**



1. In combination with an examination table, a stirrup assembly including a housing mounted in said table, a limb support bar extending through said housing and a stirrup fixed to an outer end of said limb support bar, the improvement comprising:

a pivot boss mounted in said housing for rotational movement about a substantially vertical axis,

means defining an opening through said pivot boss slidably receiving said limb support bar for longitudinal movement thereof,

a locking shoe carried by said pivot boss for rotational movement with said pivot boss, and

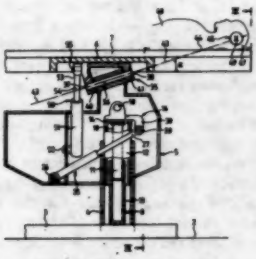
locking means carried by said locking shoe and engageable with portions of said housing for fixing said limb support bar against pivotal movement about said vertical axis.

4,958,817

OPERATING TABLE

Rudolf Heller, Zürich, and Alfred Michel, Dietlikon, both of Switzerland, assignors to Carl-Zeiss-Stiftung, Heidenheim, Fed. Rep. of Germany

Filed Oct. 13, 1989, Ser. No. 421,086
Claims priority, application Switzerland, Nov. 4, 1988, 04105/88
Int. Cl.[5] A61G *13/00*
U.S. Cl. 269—323 **4 Claims**



1. An operating table, in particular for microsurgery of the throat, nose or ears of a patient, comprising:

means defining a rolling axis;

a patient rest structure;

said patient rest structure having a predetermined longitudinal direction;

said rolling axis being disposed essentially within a verti-

cal plane which is substantially parallel to said predetermined longitudinal direction of the patient rest structure;

means for supporting said patient rest structure during rolling movements such that a surgical operating site remains essentially at the same location during said rolling movements;

said means defining said rolling axis including table rolling bearing means having a predetermined longitudinal axis;

said table rolling bearing means being inclined at a predetermined angle to said patient rest structure;

said predetermined longitudinal axis of said table rolling bearing means extending through a predetermined central point which is located in said surgical operating site and substantially disposed in said vertical plane; and

means for supporting said patient rest structure during pitching movements such that said surgical operating site remains essentially at the same location during said pitching movements.

4,958,818

CLAMPING BLOCK

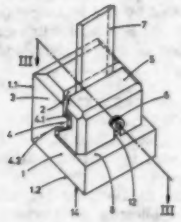
Beat Buchter, Hallau, Switzerland, assignor to Buchter Formenbau AG, Switzerland

Filed Jul. 31, 1989, Ser. No. 387,535

Claims priority, application Switzerland, Aug. 11, 1988, 3035/88

Int. Cl.[5] B23Q *3/02*

U.S. Cl. 269—136 **6 Claims**



1. A clamping block for clamping workpieces or tools comprising: an essentially L-shaped block base having a first leg and a second leg, said first leg and said second leg being of about equal length, said first leg having a fixed clamping jaw thereon, said fixed clamping jaw having a front face including a first clamping surface and a projecting support portion, said support portion having a clamping reference surface and a wedge-shaped control surface, and said second leg having a moveable clamping jaw connected thereto, said moveable clamping jaw including a second clamping surface opposite and parallel to said first clamping surface of said fixed clamping jaw and a wedge surface complementary and opposite to said control surface of said fixed clamping jaw, said second leg also including first guidance means for the approximately parallel guidance of said moveable clamping jaw relative to said front face of said fixed clamping jaw, a top face perpendicular to said front face of said fixed clamping jaw and second guidance means for the lateral and transverse guidance of said moveable clamping jaw relative to said top face of said second leg, said second guidance means including a pin and at least one spring element protruding perpendicularly from said top face; and clamping screw means for displacing said moveable clamping jaw relative to said block base, whereby said wedge surface of said moveable clamping jaw may be brought into contact with said control surface of said fixed clamping jaw.

4,958,819

LAYING MACHINE

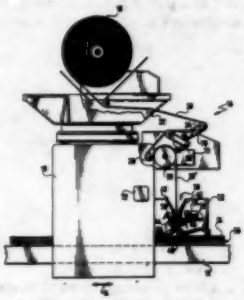
Rolf Jung, Waiblingen, Fed. Rep. of Germany, assignor to Krauss u. Reichert GmbH & Co., Fed. Rep. of Germany

Filed Dec. 19, 1988, Ser. No. 286,424

Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744034

Int. Cl.[5] B65H *29/46*

U.S. Cl. 270—31 **17 Claims**



1. Laying machine for laying out a fabric web, comprising:

a fabric web guide mechanism which draws the fabric web off a fabric reel and lays it out as a fabric layer;

said web guide mechanism including a fabric feed device which feeds said fabric web in accordance with the speed of said laying machine; and

a tension relief control means which by means of at least one non-contacting sensing barrier detects a fabric web loop formed in the course of guidance of said fabric web with respect to its deviations from a normal size; said fabric web loop being arranged between said fabric feed device and said laid-out fabric layer, in that said fabric web loop is formed by a bend of a free-falling fabric web piece in a direction extending transversely to the direction of fall whereby said sensing barrier detects a change in the length of the arc of said bend through displacement of said freely hanging bend; and

said sensing barrier extending at an acute angle to the surface formed by said fabric web.

4,958,820

SHEET STORING APPARATUS FOR COPYING MACHINE

Akiyoshi Johdai; Keichi Kinoshita; Hiroki Yamashita, and Toshio Matsui, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 17, 1988, Ser. No. 233,324

Claims priority, application Japan, Aug. 20, 1987, 62-207646; Aug. 20, 1987, 62-207647; Aug. 20, 1987, 62-207649; Aug. 20, 1987, 62-207650; Aug. 20, 1987, 62-207651

Int. Cl.[5] B65H *39/00*

U.S. Cl. 270—52 **19 Claims**

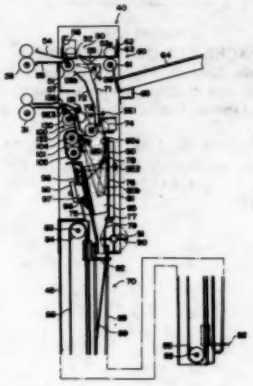
1. A sheet storing apparatus for storing sheets having an image formed thereon by an image forming apparatus in substantially vertically placed condition, comprising:

a receiving roller member for receiving each of the sheets discharged from said image forming apparatus and transporting the sheets substantially downward;

a bottom plate member for regulating the front end of each of the sheets transported downward by said receiving roller member so that the sheets are substantially vertically held thereon; and

guide means for guiding each of the sheets transported

downward to said bottom plate member, said guide means including a first guide member which acts on both sides of



the sheets and a second guide member which acts on the center portion of the sheets, thereby curving the sheets.

4,958,821

RECORDING SHEET STACKING APPARATUS IN IMAGE RECORDING SYSTEM

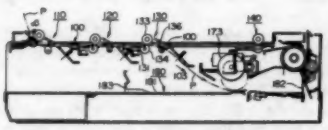
Akira Kosugi, and Kouichi Hanada, both of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Aug. 18, 1988, Ser. No. 234,025

Claims priority, application Japan, Aug. 25, 1987, 62-211690

Int. Cl.[5] B65H *5/22*; G03G *21/00*

U.S. Cl. 271—3.1 **1 Claim**



1. A sheet stacking apparatus for use in an image recording system in which a feeding means feeds recording sheets to an image forming means to record a first image on a first side of said sheets, a conveying means conveys the recording sheets with the first image recorded thereon to a sheet stacking apparatus, and said feeding means delivers said recording sheets from said sheet stacking apparatus to said image forming means to form a second image on a second side of said sheets, said sheet stacking apparatus comprising;

a sheet stacking means having a tray for receiving said recording sheets thereon;

a stopper provided on said tray to stop said recording sheets and align the leading edges of said recording sheets;

a bumper roller which is capable of retractably shifting to a downward position to be in pressure contact with said recording sheets and transport said recording sheets by rotary motion of said roller so that the leading edges thereof reaches said stopper and, an upward position to detach from said recording sheets when said leading edges reach said stopper;

a sensor located upstream from said roller for detecting the passage of said recording sheets through said conveying means and;

a control means for controlling the position of said roller in response to a signal from said sensor so that said roller is shifted downward onto the recording sheets to be aligned when said sheets enter said tray.

4,958,822

SHEET FEEDERS

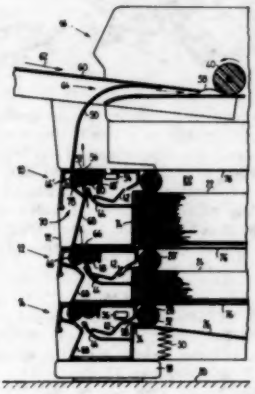
Albert Rutishauser, and Thomas Rutishauser, both of Uerikon, Switzerland, assignors to Rutishauser Data AG

Filed Mar. 2, 1989, Ser. No. 317,853

Claims priority, application Switzerland, Mar. 7, 1988, 00839/88

Int. Cl.[5] B65H *3/44*, *1/04*

U.S. Cl. 271—9 **9 Claims**



1. A single-sheet feeder for a copier or printer, the sheet feeder comprising at least two magazines for receiving a stack of sheets each arranged substantially horizontally and superimposed one on another, each magazine comprising a single-sheet feed mechanism and means defining a substantially vertical sheet conveying path provided internally thereof, the individual conveying paths combining to provide an overall conveying path for the sheet feeder, the means defining the substantially vertical sheet conveying path in each of the magazines comprising channel means and each magazine comprising deflection means operable, in use, to deflect a sheet from a substantially horizontal sheet conveying direction imparted by the single-sheet feed mechanism to the substantially vertical sheet conveying path, and further comprises common conveying means located after the deflection means and the channel means in the conveying direction, thereby to convey sheets arriving from the deflection means or from the channel means, the conveying means of each magazine being drive-connected to a single drive, and the single-sheet feed mechanisms being coupled to the single drive via respective controllable clutches, the drive comprising a motor coupled to the conveying means via a one-way coupling.

4,958,823

PAPER FEEDING STAND

Hiroshi Iwaki, Ichinomiya; Yoshiharu Mita, Himeji; Jiro Miyazaki, Ogaki; Akihiko Suto, Anpachi; Satoshi Hirose, Anpachi, and Tadashi Renbutsu, Anpachi, all of Japan, assignors to Sanyo Electric Co., Ltd., Osaka, Japan

Filed Dec. 12, 1988, Ser. No. 283,535

Claims priority, application Japan, Dec. 19, 1987, 62-322226; Dec. 19, 1987, 62-322227

Int. Cl.[5] B65H *3/06*

U.S. Cl. 271—9 **18 Claims**

1. A paper feeding stand on which a recording apparatus is

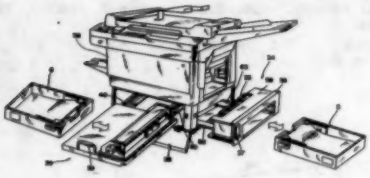
mounted and which feeds paper to said recording apparatus comprising:

a frame;

means for mounting said recording apparatus on said frame;

a paper feeding part disposed within said frame for holding and feeding the paper to said recording apparatus;

a paper feeding roller unit which is provided at the position



opposing a paper entry portion of said recording apparatus, said paper feeding roller unit feeding the paper delivered from said paper feeding part to said recording apparatus according to the rotation thereof; and

moving means for making said paper feeding part and said paper feeding roller unit movable with respect to said frame in the direction parallel to the feeding direction of the paper from said paper feeding part.

4,958,824

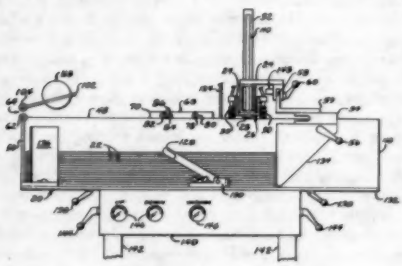
AUTOMATIC STRIP AND SHEET LOADER SYSTEM

Samuel P. Willits, Barrington; Samuel Meiri, Skokie, and Jon C. Muckerheide, Arlington Heights, all of Ill., assignors to Spartanics, Ltd., Rolling Meadows, Ill.

Filed Nov. 9, 1988, Ser. No. 269,777

Int. Cl.[5] B65H *3/08*

U.S. Cl. 271—11 **20 Claims**



1. A system for successively feeding the topmost sheet of plural stacked sheets on command, comprising

magazine means for supporting said plural stacked sheets, said magazine means comprising base means, a back wall and a forward wall,

pickup head means adjustably mounted on said magazine means for separating and lifting one end of said topmost sheet from the remaining plural stacked sheets,

separator means mounted on said magazine means and movable between a home position and a forward position beneath said topmost sheet to complete the separation of said topmost sheet from the remaining plural stacked sheets and thereby support the forward end of said topmost sheet in a raised position,

drive roll means adjustably mounted on said magazine means and contacting said raised forward end of said topmost sheet and responsive to a commanded demand control signal to drive said topmost sheet from said magazine means, and

control system means connected to said pickup head means, said separator means and said drive roll means for sequentially effecting their operation in response to demand and start control signals in accord with predetermined instructions and conditions.

4,958,825

PAPER LET-OUT APPARATUS

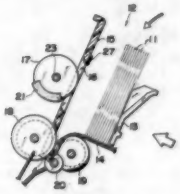
Ryuichi Onomoto, Kusatsu; Masato Nishikawa, Kyoto; Masaji Ishida, Ootsu, and Sachiro Arimoto, Kyoto, all of Japan, assignors to Omron Tateisi Electronics Company, Kyoto, Japan

Filed Feb. 10, 1989, Ser. No. 308,775

Claims priority, application Japan, Feb. 13, 1988, 63-31677

Int. Cl.[5] B65H *3/06*

U.S. Cl. 271—119 **5 Claims**



1. A paper let-out apparatus, comprising:

(a) a paper accommodating section for accommodating paper sheets in superimposed condition;

(b) a receiving plate forming a wall at one side of said paper accommodating section and formed with a window opened in a part of said receiving plate;

(c) a pushing member forming a wall at the other side of said paper accommodating section for urging said accommodated paper toward said receiving plate;

(d) a let-out roller, disposed outside said paper accommodating section to face said window, for discharging an endmost sheet of paper;

(e) a friction member provided to a part of a periphery of said let-out roller to project from said periphery and to protrude inside said paper accommodating section through said window when said let-out roller is rotated;

(f) a separation roller disposed near a let-out port of said paper accommodating section and comprising a peripheral surface having a first coefficient of friction with a magnitude to facilitate slippage of paper contacting therewith; and

(g) a friction roller disposed in facing relationship with said separation roller and comprising a peripheral surface having a second coefficient of friction with a magnitude greater than that of said first coefficient of friction.

4,958,826

PAPER FEED SYSTEM HAVING A PRESSURE PLATE THAT RESILIENTLY URGES A PLURALITY OF ELONGATED BEARING, SPRING BIASED IDLER ROLLERS AGAINST ASSOCIATED DRIVE ROLLERS FOR FEEDING A SHEET OF PAPER THEREBETWEEN

Philip L. Chen, Ranchos Palos Verdes, Calif., assignor to Microtek Lab., Inc., Torrance, Calif.

Filed Aug. 8, 1988, Ser. No. 230,157

Int. Cl.[5] B65H *3/52, 5/02*

U.S. Cl. 271—124 **5 Claims**

1. In a paper feed system for feeding sheets of paper along a predetermined path, said system including a plurality of pinch rollers formed by pairs of drive rollers and idler rollers, each of said idler rollers being rotatably supported on a support shaft, the improvement being means for resiliently urging said idler rollers towards said drive rollers to drive a sheet of paper

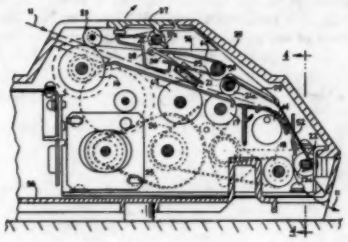
therebetween and means for releasing the idler rollers from said resilient urging comprising:

elongated bearing means for supporting each of said idler rollers for limited freedom of motion along an axis normal to the rotation axis thereof,

a pressure plate,

pivotal support means for pivotally supporting said pressure plate for motion about a predetermined pivot axis substantially parallel to the rotation axes of said idler rollers,

said pressure plate including spring means abutting against each of said idler roller support shafts at points spaced laterally from and on one side of said pivot axis,



spring means for resiliently urging said pressure plate pivotally about said support means to cause said pressure plate spring means to urge each of said idler rollers against its associated drive roller, and

a release lever,

said release lever having a first position whereat it does not drive said pressure plate and a second position whereat it drives against said pressure plate at a point therealong spaced laterally from and on the side of said pivot axis opposite to said one side thereof so as to drive said plate out of engagement with said idler rollers thereby permitting said idler rollers to move freely in their elongated bearings away from their associated drive rollers.

4,958,827

SHEET EJECTOR

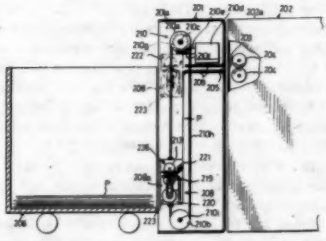
Tamaki Kaneko, Fujisawa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 31,463, Mar. 30, 1987, abandoned. This application Sep. 5, 1989, Ser. No. 403,851

Claims priority, application Japan, Aug. 20, 1986, 61-194156; Aug. 20, 1986, 61-194157; Sep. 5, 1986, 61-209249

Int. Cl.[5] B65H *29/22*

U.S. Cl. 271—176 **5 Claims**



1. A sheet ejector for transporting sheets discharged from a sheet handling apparatus to a sheet tray having a sheet receiving plane arranged substantially horizontally comprising:

a movable member vertically movable from a wait position corresponding to a sheet discharge port of said sheet handling apparatus toward said sheet receiving plane of said sheet tray;

a pair of rollers, a drive device for said rollers and stopping means for said rollers which are disposed on said movable member for holding a sheet discharged from said sheet handling apparatus and for discharging the sheet to said sheet tray by rotating;

means for discharging sheets from said sheet handling apparatus so that said discharged sheet is held by said pair of rollers on said movable member positioned in said wait position;

means for transporting said movable member to a position in which said pair of rollers are located above an uppermost sheet of sheets stacked on said sheet tray while holding the sheets by said pair of rollers; and

means for rotating said pair of rollers to discharge the sheet.

4,958,828

SHEETS HANDLING DEVICE

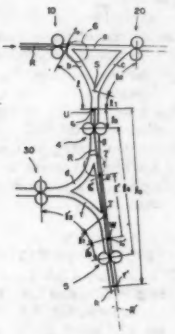
Naomasa Saito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 28, 1989, Ser. No. 345,123

Claims priority, application Japan, May 1, 1988, 63-107917; May 1, 1988, 63-107918

Int. Cl.[5] B65H *29/00*

U.S. Cl. 271—186 **17 Claims**



1. A sheets handling device comprising:

a receiving section for receiving a sheet from an image-forming apparatus;

a discharging section for discharging the sheet out of the device;

a return section for feeding back the sheet to the image-forming apparatus;

a discharge path for leading the sheet from the receiving section to the discharging section;

a first, a second, a third and a fourth reverse path consecutively connected to the receiving section;

a return path for returning the sheet from the second reverse path to the discharging section;

a composite path for leading the sheet from the second reverse path to the return section;

a double-face path for returning the sheet from the fourth reverse path to the return section;

a first means for guiding the sheet from the receiving section to the discharge path or the first reverse path;

a second means for guiding the sheet from the second reverse path to the third reverse path or the composite path;

a 1st-sheet feeder capable of rotation in either direction, disposed in the second reverse path; and

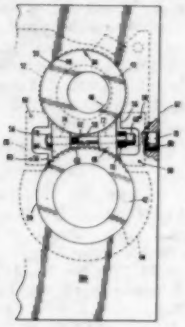
a 2nd-sheet feeder capable of rotation in either direction, disposed in the fourth reverse path.

4,958,829

ADJUSTABLE FEED ROLLS FOR FEEDING SHEETS

William F. Ward, Jr., Hampstead, Md., assignor to The Ward Machinery Company, Cockeysville, Md.

Filed Feb. 1, 1989, Ser. No. 305,808
Int. Cl.[5] B65H *5/06*
U.S. Cl. 271—273 **16 Claims**



1. Apparatus, comprising:
a pair of rotatable feed rolls;
one of said rolls being eccentrically mounted in rotatably adjustable bearing housings, adjustable rotation of said bearing housings moving said one feed roll towards or away from the other feed roll;
means for pre-loading said bearing housings in a direction away from said other feed roll; and
said preloading means comprising wedges acting upon said bearing housings and resilient means for resiliently loading said wedges against said bearing housings.

4,958,830

EXERCISE APPARATUS

Jack D. Huggins, 212 Country Club Cir., and John Pannel, 11508 Surrey La., both of Midwest City, Okla. 73110

Filed Nov. 25, 1988, Ser. No. 276,014
Int. Cl.[5] A63B *22/12*
U.S. Cl. 272—69 **4 Claims**

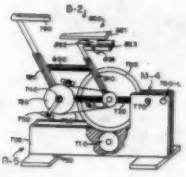
1. An exercise apparatus comprising:
an elongated housing;
means for supporting the elongated housing generally vertically;
at least one elongated bar;
means for slidably supporting the bar movement along the length of the elongated housing;
a foot support secured to the bar; and means for moving the bar along the length of the elongated housing;
wherein the means for moving one of the bars comprises:
a chain having one end secured to a lower portion of the bar;
a horizontal shaft rotatably mounted on a support;
a sprocket secured to the horizontal shaft;
an arm, having one end extending radially from the horizontal shaft and secured thereto, wherein the other end of the chain is secured to a portion of the arm extending beyond the horizontal shaft; and means for rotating the sprocket.

4,958,831

STATIONARY EXERCISING BICYCLE APPARATUS

Sang-Sup Kim, 178 E. Columbia, Des Plaines, Ill. 60016

Continuation of Ser. No. 56,856, Jun. 1, 1987, Pat. No. 4,925,183. This application Apr. 26, 1989, Ser. No. 344,015
The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.
Int. Cl.[5] A63B *21/00*
U.S. Cl. 272—73 **13 Claims**



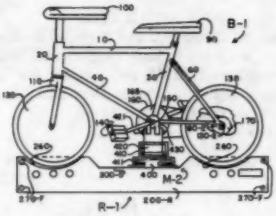
1. A stationary exercise bicycle apparatus, comprising the combination of
a bike unit having a frame, pedals supported rotatably relative to the frame, a single wheel supported rotatably relative to the frame; drive means connecting the pedal means to the wheel, a seat, and means supporting the seat relative to the frame;
a road device unit having a stationary frame structure, and a non-powered substantially free-wheeling rotatable means supported to move relative to the frame structure;
motion coordinator means coupling said bike unit frame relative to the road device unit frame structure, with said wheel frictionally coupled to roll relative to the rotatable means and vertically overlying and supported on the rotatable means;
said motion coordinator means having pivot means for mounting the bike unit frame relative to the road device unit frame structure at a location rearwardly spaced both from the seat and from the contact region between the wheel and rotatable means, to provide that the bike unit wheel transmits a force against the rotatable means that is related to the weight of the rider sitting on the seat and to the moment arm distances between the pivot means, seat and the contact region, respectively;
whereby the degree of difficulty in having the rider manually move the pedals to rotate the wheel and rotatable means, is automatically varied responsive to the weight of the rider on the bike unit, and whereby the wheel and rotatable means rolling against one another is operable to transmit feedback vibrations to the bike unit frame and seat; and
said pivot means being provided with alternative operative positions, effective to change the moment arm distances for selectively increasing or decreasing the force transmitted between the bike unit wheel and rotatable means.

4,958,832

STATIONARY EXERCISING BICYCLE APPARATUS

Sang-Sup Kim, 178 E. Columbia, Des Plaines, Ill. 60016

Continuation-in-part of Ser. No. 56,856, Jun. 1, 1987, Pat. No. 4,925,183. This application Apr. 26, 1989, Ser. No. 344,016
The portion of the term of this patent subsequent to May 15, 2007, has been disclaimed.
Int. Cl.[5] A63B *21/00*
U.S. Cl. 272—73 12 Claims



1. Indoor exercising apparatus for use with a conventional bike unit having front steering and rear drive wheels spaced apart on a wheel base, and pedals supported rotatably between the front and rear wheels, the exercising apparatus comprising the combination of

a road device unit having stationary laterally spaced sides and a non-powered substantially free-wheeling endless treadmill defining an exposed upper run extended laterally between the spaced sides and longitudinally a distance greater than the wheel base of the bike unit;

motion coordinator means coupling said bike unit and road device together, with both wheels simultaneously supported on the upper treadmill run; and

said motion coordinator means comprising:

rail means extended generally between the laterally spaced sides, with clearance overlying the upper run of the endless treadmill and underlying the bike unit proximate the rotatable pedals; and

a pair of laterally rigid telescoping members, means securing one end of one telescoping member firmly relative to the bike unit proximate the rotatable pedals, means guiding the opposite end of the other telescoping member for free movement along the rail means and laterally of the endless treadmill, means allowing substantial relative rotation of the securing and guiding means about the longitudinal axis of the telescoping members, and means allowing only limited tilting of the telescoping members relative to the rail means;

whereby said motion coordinator means is operable to hold the bike unit substantially fixed longitudinally on the treadmill while allowing lateral steering and limited tilting of the bike unit relative to the treadmill, to simulate riding the bike unit on a real road surface.

4,958,833

APPARATUS FOR ADJUSTING THE RESTING HEIGHTS OF FREE-MOVING BARBELLS ON WEIGHT-TRAINING RACKS OR STANDS

Vernon L. Stater, 1140 Kimberly Pl., Redlands, Calif. 92373

Filed Oct. 28, 1988, Ser. No. 264,144
Int. Cl.[5] A63B *21/072*
U.S. Cl. 272—123 2 Claims

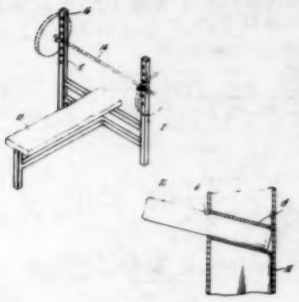
1. A device for adjusting the rest height of upright standards in a weight-training rack or stand utilizing a free-moving barbell, comprising:

a weight-training rack or stand with associated upright standards for supporting a free-moving barbell;

support plugs;

at least one hole in each upright standard into which a said support plug slidably fits; and

means for retaining said plugs in said standards to support said barbell including pockets located within said standards and behind said holes, said support plugs being slidably positionable in said pockets and extending outwardly of said pockets when positioned therein to support said barbell, said pockets and said support plugs slidably positionable therein being both angled such that the angle formed by the intersection of each said upright standard and the extended portion of each said support plug is less than 90°.

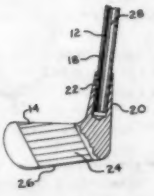


4,958,834

GOLF CLUB ASSEMBLY

Robert E. Colbert, 2905 S. Wooddale, Jackson, Mich. 49203

Continuation of Ser. No. 194,168, May 16, 1988. This application Nov. 20, 1989, Ser. No. 438,972
Int. Cl.[5] A63B *53/00*; B23P *11/00*
U.S. Cl. 273—77 A 10 Claims



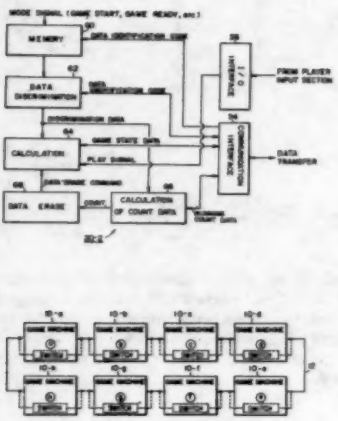
7. In a set of golf clubs consisting of a plurality of golf clubs wherein each club consists of an elongated shaft having a lower end and a club head affixed to the shaft lower end, the shaft having a circumference including an elongated longitudinal seam inherently resulting from the shaft manufacture and the assembled golf club having a front side defined by the direction of club movement during the striking of a golf ball and a rear side 180° opposite to the front side, characterized by the orientation of the shaft seam of each shaft of each golf club of the set being substantially identically oriented to its associated club head face.

4,958,835

GAME PLAYING SYSTEM

Koichi Tashiro; Shinichiro Okamoto, both of Kawasaki, and Tatsuro Okamoto, Yokohama, all of Japan, assignors to Namco Ltd, Tokyo, Japan

Filed Sep. 29, 1988, Ser. No. 250,569
Claims priority, application Japan, Oct. 3, 1987, 62-250259
Int. Cl.[5] A63F 9/22
U.S. Cl. 273—85 G **7 Claims**



1. A game playing system comprising a plurality of independent game machines, each of said game machines being playable in a single-player game and a multi-player game with the other game machines simultaneously in the same game space by the reception and transmission of data between one player's game machine and the other game machines through data transmission lines which connect said game machines together into a loop, each of said game machines comprising:

communication interface means for performing the reception and transmission of data between the one player's game machine and the other game machines through said data transmission lines,

said data including game state data representative of the progress of the game for each of said game machines, data identification codes representative of each game machine corresponding to said game state data, and running count data incremented at each time when said game state data passes through a respective one of said game machines; and

game calculating means for performing the reception and transmission of data between the one player's game machine and the other game machines through the communication interface means to make a calculation of the game in a common game space, said game calculating means comprising:

a data discriminating section means for checking, at each time when data are transmitted to the one player's game machine, a data identification code included in said transmitted data to discriminate whether or not said transmitted data belongs to the one player's game machine;

a count data calculating section means for clearing running count data and transmitting the cleared running count data to a next game machine when data belonging to the one player's game machine are transmitted to the one player's game machine, and for incrementing the running count data and transmitting the incremented running count data to the next game machine when data relating to any one of the other game machines are transmitted to the one player's game machine; and

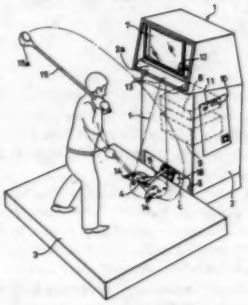
a data erasing section means for discriminating whether or not the running count data is higher than a given reference level each time data are transmitted to the one player's game machine, and for forcedly clearing the game state data if the running count data is higher than the reference level, whereby even if there is created any abnormality in any one of the game machines defining said loop, the remaining game machines can be normally played in the game.

4,958,836

GOLF SIMULATOR

Kuniharu Onozuka, Kanagawa, and Takashi Yoshino, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Dec. 15, 1989, Ser. No. 451,149
Claims priority, application Japan, Dec. 27, 1988, 63-329682
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—184 R **9 Claims**



1. A golf simulator having a housing in which a display and a reproducing device are accommodated, and an arm to the distal end of which a ball is secured, comprising:

a bed plate which supports a horizontal shaft;

a swingable bed rotatable on the horizontal shaft, and having another shaft which makes a right angle with the horizontal shaft, and to which the proximal end of the arm is rotatably secured; and

drive means for driving the swingable bed so as to enable the swingable bed to be selectively positioned in either of a first state in which the arm slants toward spacing downwardly from the horizontal line at the distal end thereof due to forward inclination of the shaft of the swingable bed with respect to the vertical line, and slants toward approaching the front side of the housing, and a second state in which the arm slants toward spacing upwardly from the horizontal line at the distal end thereof due to backward inclination of the shaft of the swingable bed with respect to the vertical line.

4,958,837

TRAVEL GAME WITH A GAME BOARD DISPLAY SCREEN AND ELECTRONIC CARD READER

Faye Y. Russell, 1642 E. 84th St., Chicago, Ill. 60617

Filed Jun. 23, 1989, Ser. No. 369,738
Int. Cl.[5] A63F 3/00, 9/18
U.S. Cl. 273—237 **8 Claims**

1. A travel game, comprising:

display means;

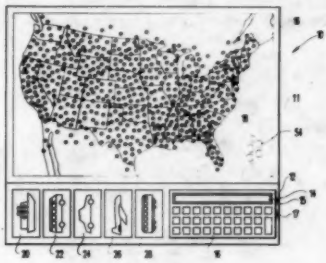
programmed control means operatively connected to said display means for producing a geographic map display;

said programmed control means operative to display travel routes between selected geographic locations;

a plurality of groups of travel mode cards, each group of cards bearing indicia representing a different mode of travel;

game marker pieces for representing player travel movement along said travel routes;

a rotationally mounted globe having indicia representing movement increments for selection by a stationary indicator for randomly determining movement of said game marker pieces along said travel routes;



means for selecting travel route origins and destinations;

means for posing questions regarding travel route landmarks;

means for assessing time and score awards and penalties; and

score keeping means for tabulating said time and score awards and penalties.

4,958,838

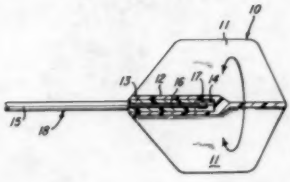
SNAP-ON DART FLIGHT

Charles W. Farler, 4503 Woodbine Ave., Dayton, Ohio 45420

Continuation-in-part of Ser. No. 868,804, May 27, 1986, abandoned. This application Oct. 14, 1986, Ser. No. 918,720

Int. Cl.[5] A63B *65/02*

U.S. Cl. 273—423 **7 Claims**



1. A snap-on removably attached dart flight comprised of a flight bushing tube located along the central axis of said flight, a plurality of vanes or fins equally spaced around said flight bushing tube and an axial cavity whose inner diameter has one or more respective recess(es) and/or extension(s) whose distance(s) and shape conform substantially to those respective extension(s) and/or recess(es) mating portion(s) of a flight shaft and capable of engaging in a slip-fit union therewith yet leave a gap or a space therebetween permitting said flight to be free to rotate 360 degrees, clockwise or counter-clockwise, around such shaft and wherein said flight is characterized in that no portion of the means of flight attachment is external to any external surface of said flight.

4,958,839

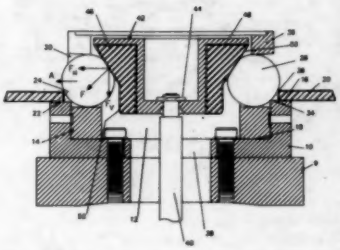
DISC CLAMP EMPLOYING RESILIENT CONE FOR SPREADING BALLS

Nahum Guzik, Mountain View, and Vinod Rao, Fremont, both of Calif., assignors to Guzik Technical Enterprises, Inc., San Jose, Calif.

Filed Jul. 12, 1988, Ser. No. 217,875

Int. Cl.[5] B23B *31/40*; G11B *25/04*

U.S. Cl. 279—2 R **15 Claims**



1. A clamping mechanism for a computer hard disc having a predetermined thickness and a central opening, comprising:

a disc support having a cylindrical opening, side walls, a bottom wall, an upper surface for supporting a hard disc to be clamped, and a central opening in said bottom wall,

said cylindrical opening of said disc support having a diameter substantially equal to said central opening of said hard disc;

a cylindrical retainer slidingly inserted into said cylindrical opening of said support and resting upon said bottom wall of said disc support,

said retainer having more than three through openings in a side wall thereof, said openings being uniformly spaced in a circumferential direction, said openings having axes located higher than the upper surface of said hard disc when said disc rests on said upper surface of said support;

a plurality of rigid balls slidingly located in said respective through openings of said retainer, said balls having diameters exceeding the thickness of said side wall of said retainer;

a pull rod capable of moving in the longitudinal direction, said pull rod having an upper end which passes through said central opening of said bottom wall into said cylindrical retainer;

a conical element rigidly attached to said upper end of said pull rod, said conical element having a continuous outer conical surface which is resilient and softer than said balls,

said conical element having a larger diameter end and a smaller diameter end, said larger diameter end located above said balls and said smaller diameter end facing said bottom wall of said support,

said conical element and said pull rod being moveable between upper and lower positions and being shaped such that when said pull rod and said conical element are in their upper position, the conical surface of said conical element rests upon said balls, and such that when said pull rod and said conical element are pulled down to their lower position, said conical surface will wedge and hold said balls outwardly to positions where they lock said hard disc onto said support.

4,958,840

SELF DISENGAGING KEYLESS CHUCK

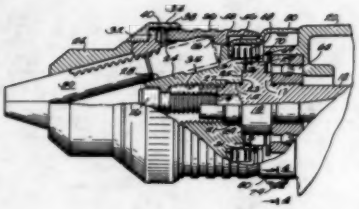
Bernhard Palm, Brookfield, Wis., assignor to Milwaukee Electric Tool Corporation, Brookfield, Wis.

Filed May 27, 1988, Ser. No. 199,842

The portion of the term of this patent subsequent to Jul. 28, 2004, has been disclaimed.

Int. Cl.[5] B23B *31/12*

U.S. Cl. 279—62 **6 Claims**



1. A chuck comprising,

a chuck body having an axis of rotation and a front,

three jaws mounted on said body on axes converging forwardly and inclined relative to said axis of rotation and equally spaced around the body, said axes being positioned relative to the axis of the chuck body so that the jaws move inwardly on said converging axes toward a fully closed position and outwardly on said axes towards a fully open position,

a split nut mounted on said body for rotation relative to said body and encircling said jaws, said split nut having a threaded connection with the jaws whereby said jaws move on said inclined axes between said fully closed position and said fully open position in response to relative rotation between said body and said split nut,

a retainer having a press fit on said split nut to retain said split nut assembled,

a sleeve having an inside and an outside and mounted on said body for axial movement relative to said body,

first and second interference members,

said first interference members being integral with said sleeve,

said second interference members facing rearwardly and being integral with said split nut and being engaged by said first interference members as said sleeve moves axially forwardly on said body,

said outside of said sleeve being manually engaged to move said sleeve axially,

said jaws being engageable with said inside of said sleeve as the jaws approach said fully open position so that the sleeve is moved rearwardly to disengage said first interference members from said second interference members.

4,958,841

GARMENT HANGER CADDY CART

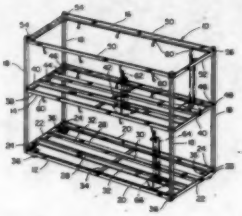
Cletus F. Keen, 2736 S. Punta Del Este Dr., Los Angeles, Calif. 91745

Filed Jun. 26, 1989, Ser. No. 371,066

Int. Cl.[5] B62B *3/10*

U.S. Cl. 280—47.35 **9 Claims**

1. A cart for supporting and transporting a plurality of hanger caddies of the type including lower horizontal base portions having front and rear margins and upper loop portions, said cart including a horizontally elongated lower frame incorporating a pair of first elongated, longitudinally extending, laterally spaced apart and upwardly and inwardly opening lower angle members, a pair of transverse low end members extending between and interconnecting the corresponding ends of said angle members, a pair of second elongated, longitudinally extending and upwardly and outwardly opening angle members extending between and supported from longitudinal mid-portions of said transverse end members and spaced inwardly of said pair of first angle members, said cart also including two pairs of opposite end corner uprights between lower portions of which said lower angle members and low end members extend are secured, a pair of opposite side, horizontally elongated, longitudinally extending and laterally spaced apart upper side members supported from and extending between upper portions of said corner uprights above said



first lower angle members and a pair of upper transverse end members supported from and extending between said upper portions of the corresponding opposite end uprights, said upper side members each including downwardly projecting and upwardly opening hook members spaced longitudinally therealong over which to engage the loop portions of hanger caddies having their base portions supported from, spanning between and spaced along the corresponding first and second angle members of said cart.

4,958,842

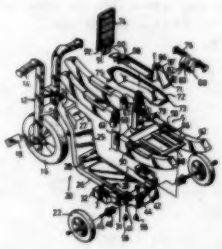
CONVERTIBLE TOY KIT

Morgan Chang, No. 291, Sec. 1, Chang Nan Rd., Chang Hua City, Taiwan

Filed Apr. 18, 1989, Ser. No. 340,131

Int. Cl.[5] B62K *13/00*

U.S. Cl. 280—7.1 **8 Claims**



1. A convertible toy kit comprising:

a scooter including a front portion having a pair of handles on an upper end thereof and a front wheel on a lower end thereof; a pair of driving pedals pivoted on an axle of said front wheel; a front plate having a front end thereof vertically and pivotally connected to a center portion of said front portion so that said front portion is rotatable relative to said foot plate about a vertical axis; a pair of wheel assemblies provided on a rear end of said foot plate; and at least one set of female retainers provided on said foot plate; and

a rocking horse including a base portion and a seat portion; said base portion having a pair of parallel and foldable bars, each of said parallel bars including two halves pivot-

ally connected together, one half of each of said parallel bars being fixed together by several lateral bars and an other half thereof being foldable to abut said one half, one set of male retainers being provided on said lateral bars; said seat portion being fixed on said base portion; said rocking horse being fixable on said scooter via said female retainers and said male retainers.

4,958,843

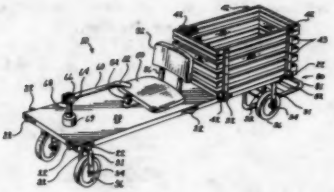
MULTI-PURPOSE SPEED-AWAY TOY COASTER VEHICLE AND METHOD THEREFOR

Millard S. Cole, 1333 Linden Rd., Prescott, Ariz. 86301

Filed Feb. 2, 1990, Ser. No. 473,820

Int. Cl.[5] B62B *3/02*

U.S. Cl. 280—30 **1 Claim**



1. A multi-configuration toy vehicle, comprising:

a frame having a horizontal bed approximately five feet constructed of rigid and resilient material for withstanding loads during normal riding and hauling by playful children, said horizontal bed having multiple bracket means, along a perimeter thereof, for receiving and firmly holding in place attachments for said frame;

an inverted U-shaped front wheel axis bracket having two legs an d being rotatably anchored to an underside of a front of said bed, each leg of said front bracket extending downward and bifurcating to form a fork capable of supporting an axle means and a roller bearing wheel;

an inverted U-shaped rear wheel axle bracket having two legs and being rigidly anchored to an underside of a back of said bed, each leg of said rear bracket extending downward and bifurcating to form a fork capable of supporting an axle means and a roller bearing wheel;

a steering assembly comprising a handle bar to control the direction of motion of said toy vehicle, said handle bar being capable of assuming any position from horizontal to vertical by being pivotally attached to two parallel plates affixed to a vertical pipe that is firmly and rotatable held in place through said bed by a sleeve and that is tightly fastened to a receiving collar located in a middle of said front wheel axle bracket, a friction plate coupled to said steering assembly to protect said bed from potential damage caused by wear due to steering rotation of said front wheel axle bracket;

a horizontal platform attached to and protruding backward from the underside of said bed, said platform being provided fro standing while riding in hte back of said toy vehicle;

a front seat with a back for attachment to a top front portion of said bed;

a back seat with a back for attachment to a top rear portion of said bed, handle bar means comprising one of said back seat having a frame extending upward to form a handle bar for the rider on said platform in the back of said bed and a vertical handle bar means for attachment on a top rear portion of said bed to provide stability for a rider on said platform;

two side rails equal in length to the length of said bed, each of said side rails consisting of rigid horizontal staves equipped with and held together by vertical pegs for holding the side rail in place in said brackets along the sides of said bed;

one back rail equal in length to the width of said bed, said back rail consisting of rigid horizontal staves equipped with and held together by vertical pegs for holding the back rail in place in said brackets along the back of said bed.

4,958,844

LOAD BEARING STRUCTURAL MEMBER AND FRAME STRUCTURE

John P. Hancock, Egham, England, assignor to British Alcan Aluminium PLC, Buckinghamshire, England

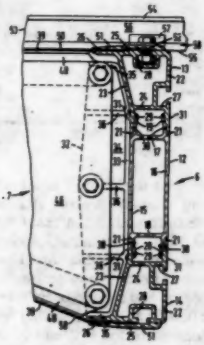
PCT No. PCT/GB87/00100, § 371 Date Sep. 14, 1988, § 102(e) Date Sep. 14, 1988, PCT Pub. No. WO87/04679, PCT Pub. Date Aug. 13, 1987

PCT Filed Feb. 10, 1987, Ser. No. 246,302

Claims priority, application United Kingdom, Feb. 10, 1986, 8603235

Int. Cl.[5] B62D *21/02*

U.S. Cl. 280—185 **8 Claims**



1. A load bearing member comprising at least first and second hollow extrusions of light metal alloy, a pair of limbs having tips thereon projecting from said first extrusion and each having a first, inner surface thereon, said second extrusion having at least one part to extend between said limbs which part has a pair of second outer surfaces thereon to engage said first surfaces, inner ends of each of said second surfaces terminating in an outwardly directed shoulder, the respective first and second surfaces being mated together with a layer of adhesive therebetween, said mating occuring by relative linear movement of the extrusions in a single direction until the tips approach the shoulders at an angle between each pair of mated surfaces and said single direction of 5° to 15°, and means for ensuring that the layer of adhesive extends between the shoulders and the tips wherein said means for ensuring comprises at least one of each pair of mating surfaces formed with a recess communicating with a space between the associated shoulder and tip to ensure that the relative movement of extrusions in said single direction forces adhesive from the recess through the space.

4,958,845

EXTENDABLE TRAILER APPARATUS

Donald J. Parks, 7310 W. Hazelwood, Phoenix, Ariz. 85033

Continuation-in-part of Ser. No. 245,027, Sep. 16, 1988, abandoned. This application Jun. 19, 1989, Ser. No. 355,493

Int. Cl.[5] B62D *53/08*

U.S. Cl. 280—407.1 **13 Claims**

1. Extendable trailer apparatus, comprising in combination:

first frame means for supporting a load to be hauled having a first overall length, including

bed means on which the load is disposed,

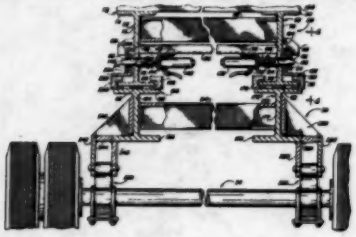
first beam means secured to the bed means for supporting the bed means and the load, and

second beam means spaced apart from and disposed generally parallel to the first beam means and secured to the bed means for supporting the bed means and the load with the first beam means;

second frame means movable relative to the first frame means between an open and a closed position, including

third beam means having a first full length and disposed adjacent to the first beam means for movement relative to the first beam means,

fourth beam means having a second full length and disposed adjacent to the second beam means for movement relative to the second beam means,



slider means secured to the third and fourth beam means and extending substantially the first and second full lengths of the third and fourth beam means for guiding the first and third beam means and the second and fourth beam means as the third and fourth beam means move relative to the first and second beam means and on which the first and second beam means are disposed, wherein the first frame means further includes first slide bar means secured to the first and second beam means and slidable on the third and fourth beam means as the first and second frame means move relative to each other between the open and closed positions and the first and third beam means includes webs with which the first slide bar means is aligned, and

wheel and axle means operatively secured to the third and fourth beam means for supporting the first and second frame means; and

locking means for securing the first and second frame means together.

4,958,846

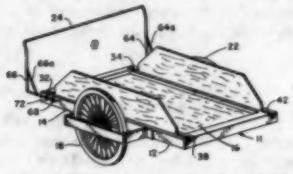
LEAF WAGON

George Greenberg, 367 Orchard La., Mastic Beach, N.Y. 11951

Filed Jan. 17, 1989, Ser. No. 297,216

Int. Cl.[5] B62B *1/20*

U.S. Cl. 280—652 6 Claims



5. In a carrier for hauling material, a first frame, said first frame formed with a horizontal slot for removably receiving a base, and vertical slots for removably receiving side walls so that by inserting a base in the horizontal slot and side walls in the vertical slots, material can be maintained in said structure, first and second truss-like frames attached to the sides of said first frame and extending over a portion of the length of said carrier, said truss-like frames comprising spaced parallel rods connected by vertical struts to lower parallel rods, a wheel removably mounted between said parallel rods of each truss-like frame so that the carrier can be easilly pulled along the ground, a second frame identical to said first frame so as to fully enclose said base, said truss-like frames overlapping said first and second frames, each of said truss-like frames including a pair of slots in the form of an inverted V and a bicycle wheel supported within each said V.

4,958,847

TOW BAR ASSEMBLY

Gregory J. Williams, 523½ E. Sixth St., Reno, Nev. 89512

Filed Sep. 23, 1988, Ser. No. 248,738

Int. Cl.[5] B60D *1/167*

U.S. Cl. 280—502 20 Claims

1. A tow bar assembly for use with a tow vehicle having an undercarriage supporting structure used to tow a disabled vehicle comprising:

two elongated tow bars, each of said bars having first and second ends;

housing means pivotally engaged to each of said first ends of said tow bars for removably clamping said tow bar assembly to said disabled vehicle;

a ball member mounted on said supporting structure of said tow truck;

socket means engaged to said second ends of said tow bars for removably and rotatably engaging said tow bar assembly to said ball member on said supporting structure of said tow vehicle; and

rotating latch means rotatably and directly engaged to said socket means for removably securing said socket means to said ball member on said supporting structure, said rotating latch means including a single integral member rotatably and directly engaged to said socket means and adapted to rotate so that said integral member will come into contact with said ball member in order to removably secure said socket means to said ball member.

4,958,848

PINTLE TYPE TRAILER COUPLING

Boyd B. Nash, 811 N. 51 Ave., Yakima, Wash. 98908

Filed May 1, 1989, Ser. No. 345,282

Int. Cl.[5] B60D *1/00*

U.S. Cl. 280—509 6 Claims

1. A trailer coupling component comprising:

(a) a housing,

(b) a pintle hook pivotally mounted in the housing and extending outwardly for coupling to a cooperating eye mounted on a towing vehicle,

(c) the pintle hook being shiftable between open and closed

positions and having a body portion, a hook portion and a radially extending arm portion having a stop surface,

(d) a first detent pivotally mounted on the housing a spaced distance from the pintle hook body portion and shiftable between an advanced position when the pintle hook is closed, and a retracted position when the pintle hook is open,

(e) the first detent having a body portion having a stop surface in abutting contact with the stop surface of the pintle hook arm when the pintle hook is in its closed position and the first detent is in its advanced position,

(f) the first detent having also an associated operating lever adjacent the pintle hook body,

(g) resilient means biasing the lever toward the advanced position of the first detent, and

(h) cam means mounted in the housing between the pintle hook body and the lever and, coacting with the resilient means, operable to shift the lever and associated first detent between their advanced and retracted positions, the cam means comprising a cam shaft rotatably mounted on the housing, and a cam body mounted on the cam shaft and having a cam surface in camming engagement with the adjacent surface of the lever, the cam shaft being axially slidable with reference to the housing and including lock means on the cam shaft for locking the cam means in the advanced position of the first detent.

4,958,849

MOUNTING ASSEMBLY AND METHOD FOR A DAMPER

William D. Pinch, Dearborn; Douglas A. Dolengowski, Troy, both of Mich.; R. Kevin Longard, Brentwood, Tenn., and Raj K. Gopwani, Utica, Mich., assignors to Saturn Corporation, Troy, Mich.

Filed Jun. 19, 1989, Ser. No. 368,686
Int. Cl.[5] B60G *5/00*
U.S. Cl. 280—668 **8 Claims**

1. A cap for receiving and mounting a strut to vehicle support structure having an opening, comprising:

(a) a planar body having upper and lower surfaces and an opening therethrough;

(b) an annular wall encircling the opening and projecting from the upper surface of the body; and

(c) resilient tab means provided at the termination of the wall, the tab means having a lateral dimension greater than the complementary dimension of the opening in the vehicle support structure and including a sloped surface

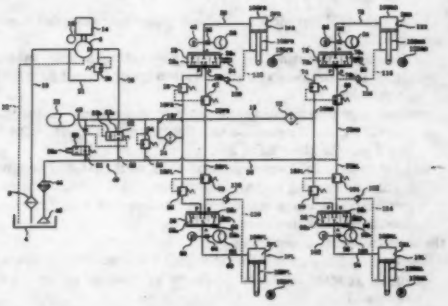
for engagement with the boundary of the opening in the vehicle support structure.

4,958,850

HYDRAULIC CIRCUIT SYSTEM FOR A VEHICLE HEIGHT CONTROL DEVICE

Shuuichi Buma, Toyota, and Hiroyuki Ikemoto, Nagoya, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed Feb. 28, 1989, Ser. No. 316,918
Claims priority, application Japan, Mar. 3, 1988, 63-50167; Nov. 10, 1988, 63-284278
Int. Cl.[5] B60G *21/06, 17/015*
U.S. Cl. 280—714 **11 Claims**



1. A hydraulic circuit system for a vehicle height control device equipped in a vehicle having a plurality of vehicle wheels, comprising:

a plurality of actuators which are provided corresponding to the vehicle wheels and are adapted to increase and decrease the vehicle heights at locations corresponding to the associated vehicle wheels as respective results of the supply and the discharge of working fluid to and from their working fluid chambers;

a working fluid supply passage means for supplying working fluid to said working fluid chambers;

a working fluid discharge passage means for discharging working fluid from said working fluid chambers;

a bypass valve means for selectively communicating said working fluid supply passage means and said working fluid discharge passage means with each other;

a plurality of control valve means which are provided in said working fluid supply passage means and said working fluid discharge passage means between said bypass valve means and said associated actuators, and which are

adapted to control the supply and the discharge of working fluid to and from said working fluid chambers, respectively;

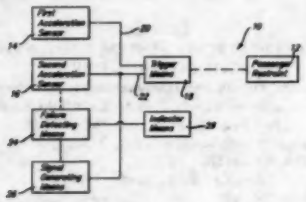
a plurality of cut-off valve means which are provided in said working fluid supply passage means and said working fluid discharge passage means between said bypass valve means and said associated actuators, and which are adapted to remain in their closed position to shut down the fluid communication of said associated supply and discharge passage means at intermediate portions thereof between said bypass valve means and said working fluid chambers so long as the pressure within said supply passage means is not more than a predeterminate value.

4,958,851

AIR BAG FIRING CIRCUIT

Leonard W. Behr, Pontiac, and Craig W. White, Grosse Pointe, both of Mich., assignors to Automotive Systems Laboratory, Inc., Farmington Hills, Mich.

Filed May 1, 1989, Ser. No. 344,291
Int. Cl.[5] B60R *21/32*
U.S. Cl. 280—735 **28 Claims**



1. In a control circuit for a vehicle passenger restraint comprising

first signal-generating means for generating a first output signal in response to an acceleration input exceeding a first threshold;

second signal-generating means for generating a second output signal in response to an acceleration input exceeding a second threshold; and

trigger means, in communication with said first and second signal-generating means, for actuating said vehicle passenger restraint upon simultaneous receipt of said first and second signals therefrom;

the improvement comprising

failure detecting means for detecting a failure of said second signal-generating means to properly respond to acceleration; and

third signal-generating means responsive to said failure detecting means, in communication with said trigger means, for generating said second signal upon failure of said second signal-generating means.

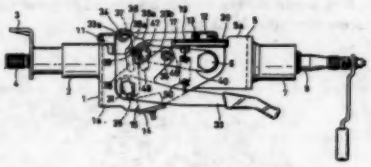
4,958,852

TILT STEERING DEVICE

Masahito Kohno, and Yoshiyuki Nakamura, both of Osaka, Japan, assignors to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Sep. 6, 1989, Ser. No. 403,423
Claims priority, application Japan, Sep. 8, 1988, 63-225426; Nov. 17, 1988, 63-292022
Int. Cl.[5] B62D *1/18*
U.S. Cl. 280—775 **8 Claims**

1. A tilt steering device comprising a fixed bracket fixed to the body of a vehicle and supporting a lower steering shaft thereon by a lower column, a tilt bracket pivoted upwardly or downwardly to the fixed bracket and supporting an upper steering shaft thereon by an upper column, the upper steering shaft being connected to the lower steering shaft by a universal joint, a spring provided between the fixed bracket and the tilt bracket and biasing the tilt bracket into an upward pivotal movement, a pivot member secured to the fixed bracket, a stopper member pivotally movably attached to the pivot member and selectively movable to a usual operation position or a retraction position, engaging means provided between the tilt bracket and the stopper member to hold the tilt bracket in an operation position against the spring when the stopper member is in its operation position or to permit the tilt bracket to be pivotally moved to an upward retracted position by the spring



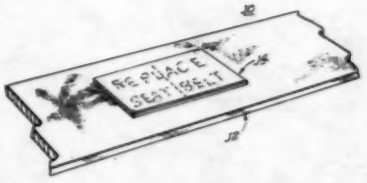
when the stopper member is in its retraction position, a retraction control lever pivotally movably attached to the pivot member so as to be selectively movable to an operation position or a retraction position, and change-over means provided between the control lever and the stopper member for holding the stopper member in its operation position when the control lever is in its operation position or permitting the stopper member to move to its retraction position when the control lever is in its retraction position.

4,958,853

SAFETY BELT WITH HIGH LOAD INDICATOR

Gerald A. Doty, Crown Point, Ind., assignor to Gateway Industries, Inc., Olympia Fields, Ill.

Filed Jan. 24, 1989, Ser. No. 301,161
Int. Cl.[5] B60R *22/12*
U.S. Cl. 280—801 **14 Claims**



1. A seat belt for restraining a passenger in a vehicle and having a force indicator, said belt comprising:

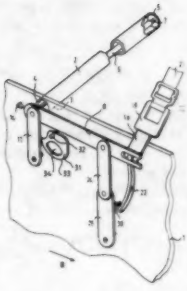
a strap of a woven fabric having a predetermined fixed length, which fabric elongates at a belt-applied tensile stress, said belt length increasing from said fixed length only due to elongation of the fabric under tensile loads applied thereto;

a laminate for informing a user of belt elongation beyond a predetermined elongation of the belt; said laminate having a means for indicating an applied force above a predetermined level and an outer, relatively frangible layer; a means for securing said laminate to said belt; said laminate mounted on said belt and secured thereon by said securing means; said relatively frangible outer layer having a tensile strength to rupture at a predetermined elongation of the fabric of said strap to expose said underlying label and inform a user that the strap has been stressed by a tensile load at least equal to a predetermined stress level correlative to said predetermined elongation.

4,958,854
LOCKING DEVICE FOR A PRE-TENSIONER FOR A VEHICLE SAFETY BELT

Lars Y. Haland, Falsterbo, Sweden, assignor to General Engineering (Netherlands) B.V., Utrecht, Netherlands

Filed May 3, 1989, Ser. No. 346,765
Claims priority, application Sweden, May 4, 1988, 8801690
Int. Cl.[5] B60R *22/36, 22/46*
U.S. Cl. 280—806 9 Claims

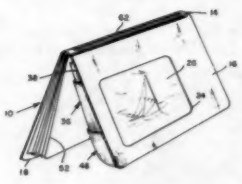


1. A pre-tensioner for a safety belt or safety harness in a motor vehicle, the pre-tensioner incorporating a triggering mechanism which is responsive to deceleration of the motor vehicle and which is mounted on a movable seat in the vehicle, wherein a locking device is provided to prevent unintentional triggering of the pretensioner on adjustment of the position of the seat, said locking device comprising pendulum means adapted, as a result of its inertia, to swing, during acceleration of the seat on forward movement thereof, from a position of rest in which the pendulum means does not prevent triggering of the pretensioner into a locking position in which the pendulum means is situated in the path of a movable part of the pre-tensioner, thus preventing triggering of the pre-tensioner.

4,958,855
PHOTO FINISHER WALLET

Robert D. Shipp, Bel Air, Calif., assignor to Rembrandt Photo Services, Los Angeles, Calif.

Filed Feb. 13, 1989, Ser. No. 310,308
Int. Cl.[5] B42D *7/00*
U.S. Cl. 281—45 17 Claims



1. A photo finisher wallet for accommodating a stack of at least twelve photographic prints of predetermined dimensions, comprising the combination of:

a flexible cover sheet foldable along a middle portion to form a front cover and a rear cover;

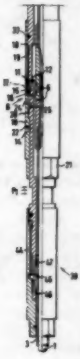
cover pocket means on the inner surface of at least one of said covers for storing the stack of photographic prints; and

a plurality of leaves, each leaf of said plurality affixed along an edge thereof to said cover sheet middle portion to form a spine and contained within said covers when said cover sheet is folded, each said leaf including on at least one side thereof a single transparent pocket of approximately said predetermined dimensions occupying approximately the entire area of said leaf and the prints insertable in said pockets, the dimensions of each of said covers being slightly greater than the dimensions of said leaves, and the dimension of said at least one cover perpendicular to said spine being sufficiently greater than the predetermined dimension of the prints perpendicular to said spine when the stack is stored in said cover pocket means and said cover sheet is folded such that the stack is precluded from interfering with said leaves in the vicinity of said spine.

4,958,856
PRESSURE ENERGIZED SEALING JOINT

Wilhelmus H. P. M. Heijnen, TA Assen, Netherlands, assignor to Shell Internationale Research Maatschappij B.V., The Hague, Netherlands

Filed Feb. 2, 1989, Ser. No. 333,927
Claims priority, application United Kingdom, Feb. 2, 1988, 8802238
Int. Cl.[5] F16L *55/00*
U.S. Cl. 285—14 10 Claims



1. A pressure energized sealing joint for use in a conduit system where during operation an elevated fluid pressure (P_1) exists at one side of the system, the joint comprising:

a pair of co-axial tubular metal sections and mechanical fastening means, said tubular metal sections having intermeshing tapered edges which are clamped against each other by said mechanical fastening means, thereby establishing a conical contact area between the tapered surfaces of said edges,

a first of said tubular sections having a tapered edge which is during operation of the device at one side thereof exposed to said elevated pressure and which has at a mid point M of said conical contact area a wall thickness (t_{mf}) which is smaller than the wall thickness (t_{mm}) of the adjacent tapered edge of a second tubular section at said mid point M, the ratio between (t_{mm}) and (t_{mf}) being selected in conjunction with the ratio between the elevated pressure (P^1) at one side of the system and a pressure (P_2) at the other side of the system in accordance with the expression: $t_{mm}/t_{mf} \geq (P_2/P_1)^2$.

4,958,857
WELDING SEAL ASSEMBLY

Thomas G. Sixsmith, El Toro, Calif., assignor to R&G Sloane Manufacturing Co., Sun Valley, Calif.

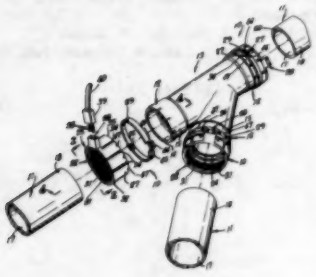
Filed Jan. 30, 1989, Ser. No. 304,327
Int. Cl.[5] F16L *13/02, 47/02*
U.S. Cl. 285—21 22 Claims

1. For use in a joint comprising a pipe and a socket element

composed of thermoplastic material and telescoped together with the pipe within the socket element, an improved welding seal assembly comprising:

a welding sleeve of thermoplastic material to be disposed between the pipe and the socket element and having an embedded electrical heating coil, said sleeve having an inside diameter sized to receive the pipe with a sliding fit;

a mounting collar for holding said welding sleeve in place in the joint, comprising a ring-like body extending around one end of said welding sleeve and having an inside diameter approximately the same as the inside diameter of the sleeve, and a radially compressible annular flange on said body spaced outwardly from said sleeve by an amount approximately equal to the thickness of the socket element, one end of said welding sleeve being secured to said body in coaxial relation with said flange whereby said collar and said sleeve define an annular seat for receiving one end of the socket element;



an electrical socket on the outer side of said collar having electrical connectors for connection to a power source, said electrical heating coil having ends constituting electrical leads that extend from said sleeve into said collar and are connected to said electrical connectors; and

a clamp ring extending loosely around said flange and including means for adjusting the size of the ring from a loose, released condition to a tightened, engaged position thereby to compress said flange around said joint and tighten the pipe and the socket element against said welding sleeve.

4,958,858

TUBE COUPLINGS

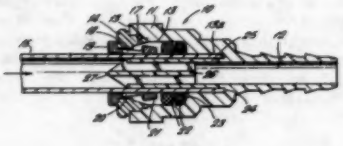
John D. Guest, "Iona" Cannon Hill Way, Bray, Maidenhead, Berkshire, United Kingdom

Filed Mar. 22, 1989, Ser. No. 327,309

Claims priority, application European Pat. Off., Mar. 25, 1988, 88302710.4

Int. Cl.[5] F16L *35/00*

U.S. Cl. 285—24 **2 Claims**



1. A tube coupling comprising a body having a throughway open at one end to receive a tube to be secured therein, a sleeve mounted concentrically out one end thereof in the throughway and extending in the throughway towards said one end of the body with a clearance between the sleeve and throughway to receive said tube to be coupled to the body, a collet disposed in said one end of the throughway having plurality of resilient fingers biased to engage the outer surface of a tube to be located in the body, a cam surface on the body adjacent to and tapering towards said open end to act on the resilient fingers and compress the fingers against the tube and a cruciform extending along and against the invention of the sleeve to support the sleeve where it is engaged by the resilient fingers and projecting from said other end of the sleeve to taper to a point spaced from the end of the sleeve, the tapered end of the cruciform extending to the outer periphery of the sleeve and free to engage an end of a tube to assist in guiding a tube over the end of the sleeve as it is inserted into the throughway.

4,958,859

PRE-ASSEMBLY MUFF FOR THE CUTTING OR CLAMPING RING OF A PIPE COUPLING

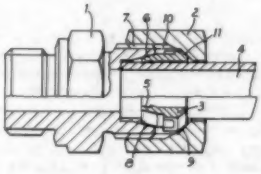
Mathias Konrad, and Wolfgang Weber, both of Lohmar, Fed. Rep. of Germany, assignors to Jean Walterscheid GmbH, Lohmar, Fed. Rep. of Germany

Filed May 1, 1989, Ser. No. 345,782

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1988, 3819635

Int. Cl.[5] F16L *35/00*

U.S. Cl. 285—39 **2 Claims**



1. A pre-assembly muff for fitting a cutting or clamping ring of a pipe coupling on a pipe, which comprises an inner cone which is designed to support the ring slid onto the pipe and into which the ring may be pressed, wherein the inner cone has been provided with several layers of wear-resistant coatings and wherein the several layers of wear-resistant coatings are colored so that consecutive layers are recognizable from one another.

4,958,860

VIBRO-ISOLATING JOINT

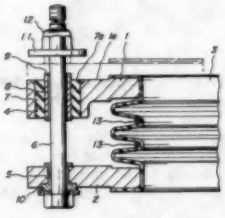
Yasuo Akitsu, Handa, Japan, assignor to NGK Insulators, Ltd., Japan

Filed Jun. 5, 1989, Ser. No. 361,361

Claims priority, application Japan, Jun. 10, 1988, 63-144420

Int. Cl.[5] F16L *11/12*

U.S. Cl. 285—49 **11 Claims**



1. A vibro-isolating joint, comprising:

two rigid annular flange members, each having a plurality of through holes arranged in an axially spaced manner;

a flexible cylindrical member interposed between said flanges;

a plurality of limiting bolts extending through opposed through holes in said flange members, each bolt being provided with an adjustable lock nut;

a plurality of cylindrical elastomer bodies, each retained in each of the through holes in at least one of said flange members; and

a plurality of hollow sleeve members, each being concentrically integrated with each of said elastomer bodies, said hollow sleeve members having one end which protrudes from one end of said elastomer bodies;

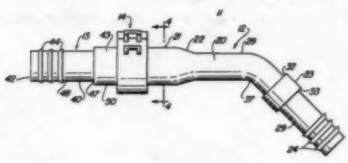
wherein the lock nuts arranged on the limiting bolts contact the protruded ends of the hollow sleeve members when said flexible cylindrical member expands and forces said flange members away from each other.

4,958,861

TUBE COUPLING

Jerry W. Hamilton, Desoto, Tex., assignor to Atco Products, Inc., Ferris, Tex.

Filed May 23, 1988, Ser. No. 197,672
Int. Cl.[5] F16L *55/00*
U.S. Cl. 285—175 **10 Claims**



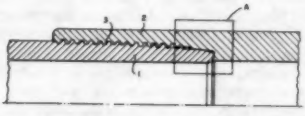
1. A tube coupling comprising: first and second tubular members; a bell end on the first tubular member; a pin end on the second tubular member; an annular ridge on each of said tubular members, said ridges being juxtaposed when said pin end of said second tubular member is inserted into said bell end of said first tubular member; a deformable band having a longitudinally extending groove formed therein; a connector loop on one end of said band; and a plurality of projections on the other end of said band, said projections being spaced at predetermined intervals along the length of said band, said connector loop and said projection cooperating to detachably secure said band to encircle said juxtaposed ridges such that said ridges extend into said longitudinally extending groove to prevent relative movement of said tubular members, said band being severable adjacent each of said projections for allowing said band to be adaptable to encircle and secure tubular members of varying diameters.

4,958,862

HERMETIC METAL PIPE JOINT

Cataldo Cappelli, Dalmine, and Norberto Morlotti, Bergamo, both of Italy, assignors to Dalmine SpA, Milan, Italy

Filed Sep. 29, 1989, Ser. No. 414,925
Claims priority, application Italy, Oct. 3, 1988, 48411 A/88
Int. Cl.[5] F16L *25/00*
U.S. Cl. 285—334 **4 Claims**



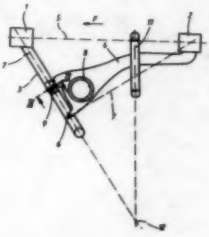
1. Hermetic metal pipe joint, comprising a male element with at least one external tapered thread and a female element with complementary internal threads, an end part of said male element beyond each thread having a conical seal surface and said female element having a conical seal surface with the same taper as that of said conical surface of the male element, the two said conical surfaces on said male and female elements mating upon tightening of the joint, the length of the seal surface of the female element along the generatrix being greater than that of the corresponding seal surface of the male element, said two seal surfaces of the male and female elements having a taper in the range 6.25 to 9.25% relative to the axis of the conical seal surface, the length of the surface of the male element which comes into contact with the corresponding surface of the female element being between 0.5 and 2.5 mm.

4,958,863

TRIANGULAR SWINGING ARM FOR WHEEL SUSPENSIONS OF MOTOR VEHICLES

Peter Tattermusch, Esslingen, Fed. Rep. of Germany, assignor to Daimler-Benz AG, Stuttgart, Fed. Rep. of Germany

Filed Jan. 26, 1989, Ser. No. 302,317
Claims priority, application Fed. Rep. of Germany, Feb. 4, 1988, 3803216
Int. Cl.[5] B60G *7/00, 3/20*
U.S. Cl. 280—696 **7 Claims**



1. Triangular swinging arm arrangement for wheel suspensions of motor vehicles, in particular passenger vehicles, said triangular swinging arm being supported against vehicle bodywork via a bearing spring and being constructed of two mutually angled arms, which are each provided with articulated mountings on the bodywork and one of which forms a supporting arm and is connected in articulated fashion in the vicinity of the wheel to the other arm, on which the wheel carrier is articulated, wherein the supporting arm carries a spring and is additionally supported yieldingly against the other arm in a manner laterally offset with respect to a connecting line between articulated mountings on the other arm and the bodywork.

4,958,864

LOCK TO PREVENT CASUAL THEFT

Roy Fischer, Scottsdale, and Paul F. Fair, Phoenix, both of Ariz., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Continuation-in-part of Ser. No. 334,512, Apr. 6, 1989, abandoned. This application Sep. 11, 1989, Ser. No. 405,483
Int. Cl.[5] E05C *7/00*
U.S. Cl. 292—19 **6 Claims**

1. A lock comprising:

a. a first wall having a catch attached thereto;

b. a second wall having:

i. a bore with a bore axis;

ii. mounting brackets positioned about the bore; and

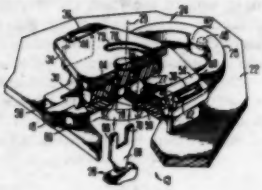
iii. a post positioned adjacent the bore;

c. a release spring having coupling means at one end for engaging the post and having a latch at its other end for engaging the catch;

d. a cam rotatable about the bore axis and having:

i. a keyway for accepting a key; and

ii. a cam surface for engaging the release spring and thereby disengaging the latch;



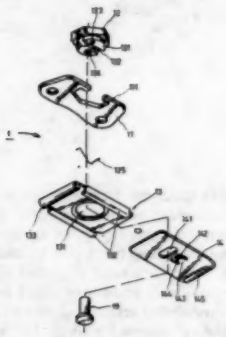
e. a retainer plate extending between and engaging the mounting brackets to hold the rotatable cam in place against an axial force exerted on the cam by insertion of the key into the keyway of the cam.

4,958,865

CLAMPING SYSTEM

Jin J. Cheng, No. 42, Lane 28, Jen Hsing St., San Chong City, Taiwan

Filed Aug. 18, 1988, Ser. No. 233,604
Int. Cl.[5] E05C *3/16*
U.S. Cl. 292—111 **4 Claims**



1. An improved clamping system for releaseably securing two external members each to the other, comprising:

(a) a hook member fixedly secured to one of said external members;

(b) chassis means fixedly secured to the other of said external members, said chasis means including a U-shaped supporting frame and a spring member extending through said supporting frame;

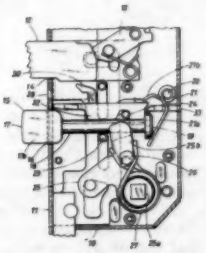
(c) means for clamping each of said external members to the other, said clamping means including a rotative displacement member having a disk shaped lower portion member, said disk member having a downwardly open horizontal groove formed therein for insertion of opposing ear members of a butterfly shaped operating plate member, an elongated spring member is positionally located substantially entirely within said horizontal groove and being compressively mounted on said opposing ear members for providing a biasing foce on said opposing ear members for positioning said butterfly operating plate member, said disk member being divided by said groove into a first section having a concavely shaped recess and a second section having an opening formed therethrough, said opening formed in said second section being located eccentric to a rotational axis of said rotative displacement member, said clamping means further including a bridge plate member having a central opening and a curved bottom wall for passing over one arm of said chassis spring member, said bridge plate member being in sliding engagement with a sliding plate member having a curved end portion for engaging said hook member and a slot formed through said sliding plate member, said slot, central opening, and opening formed in said second section of said disk member being vertically aligned for insert therethrough of an insertion pin member, said sliding plate member further including a U-shaped opening defining a spring tongue having a raised portion for removable insert into said concavely shaped recess in said disk member.

4,958,866

DOORLEAF LOCK

Ingmar Larsson, Askim, Sweden, assignor to Fixfabriken AB, Goteborg, Sweden

Filed Mar. 20, 1989, Ser. No. 325,953
Claims priority, application Sweden, Mar. 21, 1988, 8801014-5
Int. Cl.[5] E05B *15/00*
U.S. Cl. 292—245 **1 Claim**



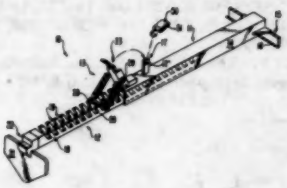
1. A doorleaf lock, having a lock mechanism for governing a locking bolt and a catch bolt, which is controllable by means of a door handle, said catch bolt, in a neutral position defined by a spring means, extending with a non-circular bolt head through a non-circular opening in the lock front wall, abutting a catch means, and being displaceable into the lock, against the action of said spring means, during manipulation of said handle, wherein said catch means is accessible via a second opening in the front wall, and displaceable from its catch position by manipulation from the outside via the second opening so that the catch bolt, after said manipulation of the catch means, can be displaced with its bolt head out of the non-circular opening to the outside of the lock, enabling a turning of the catch bolt around its longitudinal axis, wherein the catch means is pivotable around a pivot axis, which extends across the longitudinal axes of the bolts and the plane of the lock housing, wherein the pivot axis is placed adjacent the second opening; wherein the spring means comprises a hair pin spring, one limb of which rests against a foot section formed at the inner end of the bolt in the lock, and the second limb abuts the catch means keeping it in a neutral position in parallel with the longitudinal axis of the catch bolt while a ledge on the catch means forms a stop surface for the foot section; and wherein the catch means and an extension portion internal of the lock and constructed to cooperate with the catch means form a partition wall which is horizontally oriented when the lock is in an installed position.

4,958,867

LOCKING DEVICE FOR WASHERS AND DRYERS

Phillip A. Champagne, 16650 SE. Bel-Air Dr., Clackamas, Oreg. 97015

Filed Jan. 31, 1990, Ser. No. 473,021
Int. Cl.[5] E05C *19/18*
U.S. Cl. 292—259 R **8 Claims**



1. A washer and dryer lock device for use with both front and top loading washers and dryers having a hinged door wherein the lock device comprises:

a sleeve unit including an elongated hollow sleeve member having a downwardly depending flange element formed on one end and a catch element formed on top of the sleeve member at a location proximate to but spaced from the other end of the sleeve member;

a shaft unit including an elongated toothed shaft member having one end dimensioned to be received in the hollow sleeve member and further provided with a downwardly depending friction pad element secured to the other end of the shaft member; and

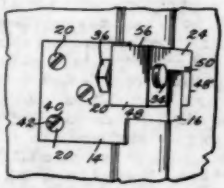
a lock unit operatively attached to the sleeve unit and provided with a pivoted latch member having a pair of spring elements operatively engaged on one end to the latch member and attached on their other end to a latch rod wherein the latch rod is dimensioned to be releasably received by the toothed shaft member.

4,958,868

DOOR BAR

Mitchell L. Watrous, Jr., 1032 Highland Park Drive, Somerset, Pa. 15501

Filed Nov. 24, 1989, Ser. No. 440,708
Int. Cl.[5] E05C *19/18*
U.S. Cl. 292—291 **7 Claims**



1. A door bar for use in combination with a door and a door frame for maintaining the door in a closed position with respect to the frame, said door bar comprising: 'a plate member defining a first substantially planar element of first predetermined thickness and a second substantially planar element of second predetermined thickness attached at substantially a right angle to said first element, said first planar element partially positioned between said door and said frame when said plate member is attached to said frame;

said first planar element defining a plurality of openings therein and means in operative relationship with said plate member, including a plurality of screws for extending into said frame through said openings, for attaching said plate member to said door frame with said second element spaced apart from said door frame;

a bar member defining first and second opposed and substantially parallel rectangular face surfaces, third and fourth opposed and substantially parallel rectangular top and bottom surfaces, fifth and sixth opposed and substantially parallel rectangular end surfaces, and a first slot, said slot having a width greater than said first predetermined thickness for enabling said bar member to be removably mounted onto said plate member between said door-door frame and said second element;

said first slot cut into said bar member from said fourth or bottom surface and said first slot extending completely through said bar member between said first and second face surfaces;

stop means adjustably attached to said bar member for contacting said door when said bar member is positioned onto said plate member with said first slot receiving said first element and when said door is in a closed position with respect to said frame; and

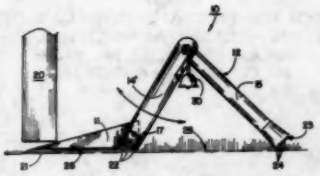
said bar member further defining a threaded opening extending completely through said bar member and wherein said stop means includes a bolt-like member comprising a threaded shaft element for threadably engaging said opening and a head element attached to a first end of said shaft element for contacting said door when said door is in a closed position with respect to said frame.

4,958,869

SECURITY STOP

Dwight S. Bisher, 5106 Wadena Ct., Greensboro, N.C. 27407

Filed Jan. 19, 1990, Ser. No. 467,553
Int. Cl.[5] E05C *17/54*
U.S. Cl. 292—339 **6 Claims**



1. A security stop comprising: a wedge-shaped base, said base having an uneven friction producing surface, a pivotable frame, said frame comprising a pair of parallel members and a longitudinal member, said parallel members each having first and second ends, said first ends comprising gripper teeth, said longitudinal member and said base pivotally joined between said pair of parallel members at opposite ends thereof, whereby said wedge-shaped base can be placed at the bottom of a door between the door and the threshold with the longitudinal member contacting the floor to thereby prevent opening of the door.

4,958,870

COMBINATION BUMPER AND TIRE STORAGE COMPARTMENT WITH TIRE LOCK MECHANISM

Bernie Carter, 7123 Thrush View #30, San Antonio, Tex. 78209

Continuation-in-part of Ser. No. 251,307, Sep. 30, 1988, Pat. No. 4,896,910. This application Oct. 10, 1989, Ser. No. 419,145
Int. Cl.[5] B62D *43/00*
U.S. Cl. 293—106 **7 Claims**

1. A combination vehicle bumper and tire storage compartment with tire lock comprising:

(a) a U shaped cross bar attachable main frame members of said vehicle near the rear of said vehicle;

(b) at least two straps attached by one end to said cross bar and attachable at the other end to a cross member of the

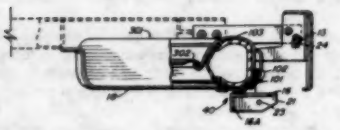
frame of said vehicle, said straps shaped to conform to the shape of a tire;

(c) a step bumper attachable to the main frame members of said vehicle by means of extensions extending from the inside of said step bumper, said extensions having first pin apertures for receiving hinge pins;

(d) a door in the step of said step bumper comprising:

(i) a rectangular box like structure open at the rear and top, and having side members, a bottom member and a front member;

(ii) hinge members extending from each of side members and aligned with the inside surface of said extensions,



said hinge members having second pin apertures for receiving hinge pins; and

(iii) hinge pins passed through said first and second pin apertures to rotatably secure said door to said extensions;

(e) a locking member having a reverse hook for engagement with an opening in a spare tire within said storage compartment, an arcuate section extending over said spare tire and a loop section extending downward toward said cross bar; and

(f) a chain member attached to said cross bar and attachable to said locking member to secure said locking mechanism is place.

4,958,871

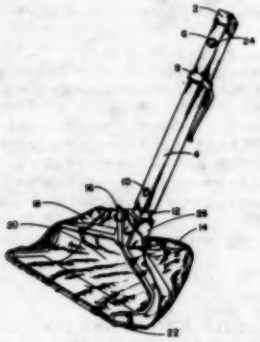
HAND TOOL FOR PICKING UP ANIMAL DROPPINGS

James W. Hemans, 10124 53rd Ave. West, Everett, Wash. 98204

Filed Apr. 17, 1989, Ser. No. 339,309

Int. Cl.[5] A01K *29/00*; E01H *1/12*

U.S. Cl. 294—1.4 **5 Claims**



1. In combination, a hand operated device for picking up animal feces that includes a plastic, telescoping, locking, two-piece, square in cross-section handle and, rigidly affixed to one end of said handle, a plastic scooping device consisting of a horizontally positioned, solid plastic, tapered in height cross section, blade attached at both ends by vertically positioned supports from the ends of said horizontally positioned blade, providing a means for a central opening between said blade and vertical supports and the end of the handle to which said vertical supports are attached, so a plastic fold-lock-top sandwich bag, consisting of a smaller pocket attached on the opposite side of a larger pocket with a flap attached which is as wide as the larger pocket opening, fits its' larger pocket through said central opening in said scooping device acting as a means for a receptacle for the animal feces,

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4,958,872

TENSILE FORCE TRANSMITTING DEVICE, IN PARTICULAR A LIFTING DEVICE

Håkan Norlén, Box 58, S-830 05 Järpen, Sweden

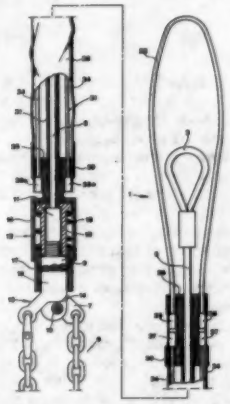
PCT No. PCT/SE88/00233, § 371 Date Dec. 12, 1988, § 102(e) Date Dec. 12, 1988, PCT Pub. No. WO88/08810, PCT Pub. Date Nov. 17, 1988

PCT Filed May 5, 1988, Ser. No. 288,010

Claims priority, application Norway, May 8, 1987, 871920

Int. Cl.[5] B66C *1/12*

U.S. Cl. 294—75 **8 Claims**



1. A device for transmitting tensile force, in particular a lifting device, comprising, at a first end portion, a first engagement member (2) adapted for engagement with a first coupling member (4), an intermediate portion (5) and a second end portion (6) adapted to form an attachment loop by the free end (13) of the second end portion being, by means of a spring loaded locking member (12), releasably locked to a locking mechanism at the end of the intermediate portion adjacent the second end portion (6), the locking member (12) being, by means of a connection arrangement (21) extending along the intermediate portion of the device, in a tensile force transmitting manner connected to a second engagement member (22, 35), which is adapted for engagement with a second coupling member (23, 36) and which upon being subjected to tensile force transmits this tensile force via the connection arrangement to the locking member (12) and thereby actuates the locking member to release the free end (13) of the second end portion so as to open the attachment loop, the intermediate portion (5) and the connection arrangement (21) being at least in part surrounded by an elongated casing (29), the intermediate portion (5) and the connection arrangement (21) comprising an elongated flexible section and the casing (29) being flexible and surrounding said section.

4,958,873

MULTI-DISK CLAMP END EFFECTOR

Minoru Akagawa, Fremont, Calif., assignor to Intelmatec Corporation, Fremont, Calif.

Filed Oct. 17, 1988, Ser. No. 251,786

Int. Cl.[5] B66C *1/54*

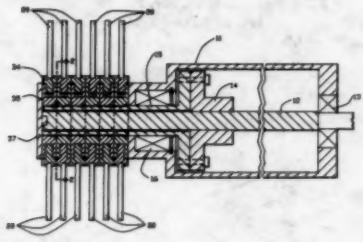
U.S. Cl. 294—93 **9 Claims**

1. A multi-disk clamp end effector for loading and sequentially unloading a plurality of disks, comprising

a supporting structure,

a tubular member slidably supported by said supporting structure, said tubular member having an external side surface and being longitudinally slidably with respect to said supporting structure, and

a plurality of holder means for removably securing disks individually to said tubular member, each of said holder means being disposed around said tubular member and attached to an annular disk and centripetally pressing said



side surface of said tubular member, each of said holder means including an elastic ring disposed around said tubular member and a plurality of arms extending radially from said tubular member, each of said arms having an end piece securely attachable to an inner rim of said annular disk and an inner piece securely attached to said end piece, said elastic ring applying a centripetal force to press said inner piece to said external side surface of said tubular member.

4,958,874

MOBILE EXHIBITION UNIT

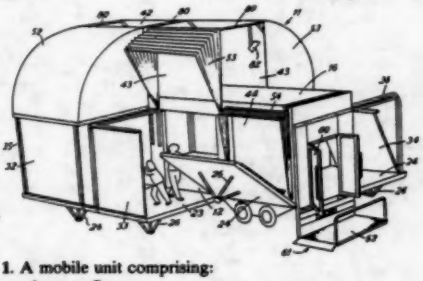
Leslie J. Hegedus, 24 Culross St., London, England W1Y 3HE

Filed Nov. 17, 1988, Ser. No. 272,624

Claims priority, application United Kingdom, Nov. 20, 1987, 8727251; Mar. 15, 1988, 8806078

Int. Cl.[5] B60P *3/025*

U.S. Cl. 296—26 **7 Claims**



1. A mobile unit comprising:

an elongate floor;

an elongate roof, said roof being stationary relative to said floor;

two generally parallel and elongate side-walls, each said side-wall comprising at least two panels, said panels being pivotable relative to said elongate floor to provide an expanded unit with floor areas additional to said elongate floor and at each side thereof; and

at least one side-roof portion, each said side-roof portion being mounted on an upwardly slidable structural member and unfolding from said trailer to cover at least part of said additional floor areas.

4,958,875

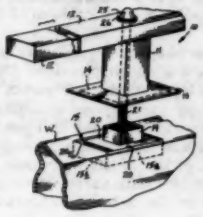
TRUCK POCKET RAIL ATTACHMENT

Larry A. Zamzow, 14000 Renaissance Ct., Apt. 2028-0, Austin, Tex. 78728

Filed Nov. 14, 1988, Ser. No. 272,062

Int. Cl.[5] B62D *33/02, 33/077*

U.S. Cl. 296—32 **3 Claims**



1. A truck pocket rail attachment apparatus for use in combination with sidewalls of a truck bed, said sidewalls including a plurality of spaced pockets formed in the sidewalls with each pocket including a rectangular opening and further including a cavity of rectangular cross-sectional configuration with side walls and end walls of a predetermined height, and said side walls of a greater lineal length than said end walls, said apparatus comprising,

an upper portion including an upper vertical hollow post means with a top wall for positioning of an elongate horizontal rail thereon, and

said upper post means including a lower terminal end integrally secured to a positioning plate means for overlying said opening, and

a lower portion including a depth post of a height greater than said predetermined height, and

a rectangular latch plate means integrally secured to a lower end of said depth post of an area substantially equal to said opening for rotation relative to said upper portion to engage lower terminal edges of said side walls, and

connecting means for securing said horizontal rail, said upper portion, and said lower portion together.

4,958,876

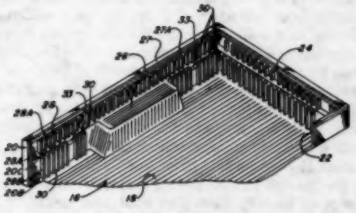
VEHICLE CARGO BED LINER

Joseph Diaco, 16 Holden Rd., Cherry Hill, N.J., and Todd R. Kennedy, Box 486, Hanover, Pa. 17331

Continuation-in-part of Ser. No. 312,571, Feb. 21, 1989, and a continuation-in-part of Ser. No. 237,049, Aug. 29, 1988, abandoned. This application Mar. 13, 1990, Ser. No. 492,904

Int. Cl.[5] B62D *33/00*

U.S. Cl. 296—39.2 **44 Claims**



1. A protective liner for a vehicle cargo bed, said protective liner permitting structure positioned in the vehicle cargo bed to be supported and affixed in position in the cargo bed, said liner comprising:

a liner floor portion positionable upon the floor of the vehicle cargo bed, said liner floor portion having elevated portions formed thereupon to conform to wheel wells protruding from the vehicle cargo bed floor;

liner sidewall portions extending upwardly from opposite sides of the liner floor portion, one of each of said liner sidewall portions being positionable against one of a pair of opposite sidewalls of the vehicle cargo bed;

a liner frontwall portion extending upwardly from a front end of the liner floor portion, said liner frontwall portion being positionable against a frontwall of the vehicle cargo bed; and

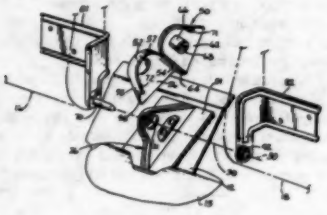
a plurality of spaced apart, vertically extend ridge members protruding in a common plan from the liner sidewall portions for at least a substantially part of the entire height thereof whereby gaps separating adjacent ones of the ridge members of each liner sidewall portion form cooperative opposed load locks of a depth sufficient to receive opposite ends of the structure positioned in the vehicle cargo bed in order to affix the structure against movement in a direction parallel to said liner sidewall portion in the vehicle cargo bed.

4,958,877

COMPOSITE PIVOT BUSHING AND COVER FOR VEHICLE SEAT HINGE BRACKET

James P. Lezotte, Redford, and Wilbur E. Schwartz, Jr., Dearborn Heights, both of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 1, 1989, Ser. No. 387,912
Int. Cl.[5] B60N *1/02*
U.S. Cl. 296—65.1 **4 Claims**



1. A composite cover and pivot bushing device for releasably enclosing a hinge bracket mounted on a vehicle body, said hinge bracket having a through bore which receives hinge pivot pin for rotation about a pivot axis, said composite device comprising:

a one piece molded synthetic resin housing having a top wall and an open lower end disposed oppositely thereto, a front end wall and an oppositely disposed aft. end . wall extending, downwardly from said top wall, a side wall and an oppositely disposed pivotal side closure extending downwardly from said top wall in spaced apart relation to one another, said walls and said side closure being correspondingly dimensioned and configured to define a chamber which encloses said hinge bracket;

said side wall integrally connected to a peripheral edge of said top wall disposed and structured for integral, interconnecting relation between said front and aft end walls, said side wall having a central circular opening with its center aligned on said pivot axis;

said pivotal side closure having a cylindrically-shaped tubular pivot bushing having an axial passageway, said pivot bushing extending through said hinge bracket bore and having a predetermined axial dimension such that its free end is positioned with an annular clearance within said side wall central opening;

said pivotal side closure being integrally joined to an adjacent one edge of said aft end wall along its axis of rotation by an integral flexible hinge web; and

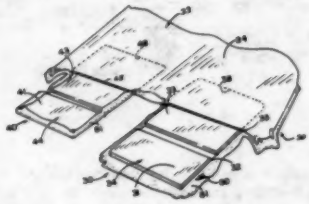
means for releasably locking said side closure in a closed position parallel to said side wall whereby said pivot bushing is captured in said hinge bracket bore with its axial passageway aligned on said pivot axis.

4,958,878

HEADLINER WITH INTEGRAL VISOR

Gordon Kempkers, Hamilton, Mich., assignor to Prince Corporation, Holland, Mich.

Filed Aug. 21, 1989, Ser. No. 396,224
Int. Cl.[5] B60J *3/00*
U.S. Cl. 296—97.5 **13 Claims**



1. An integral headliner and visor construction comprising:

a headliner body formed in the shape of a vehicle headliner;

at least one generally rectangular panel defining a visor and positioned adjacent an edge of the headliner in a location adjacent a vehicle window where the headliner is installed in a vehicle; and

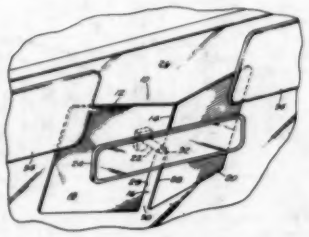
a flexible integral covering for the exterior surface of said headliner and said panel, to define a flexible joint between said panel and headliner for said visor.

4,958,879

AUTO SUN VISOR

Julius H. Gillum, 11668 Onyx St., Cypress, Calif. 90630

Filed Oct. 5, 1988, Ser. No. 253,732
Int. Cl.[5] B60J *3/00*
U.S. Cl. 296—97.6 **4 Claims**



1. A portable sun visor adapted to be carried on an arm of a rearview mirror of an automotive vehicle, comprising

an essentially rectangular member having a length ranging between about 12 and about 16 inches and a width ranging between about 6 and about 8 inches, said member having a generally flat, rigid, thin, and opaque body, with said member having a central latitudinal axis and opposed longitudinal edges,

a hinge element formed in the member by folding the member about the central latitudinal axis of the member to

divide said member into two sections which are mirror images of each other so that, upon folding the two sections about the hinge element, said sections are in registration with each other, and

an elongated slot in the member lying along the central latitudinal axis of the member, with said slot having a longitudinal axis and said latitudinal axis being along the longitudinal axis of the slot, and said slot having at one end an entry mouth along one of the longitudinal edges of the member and terminating at another end in a stop end within the body of the member,

said slot having a width ranging between about five eights and about seven eights of an inch and a length in excess of fifty percent of the width of the member but less than seventy percent of the width of the member to provide a third section between the other longitudinal edge and the stop end to enable the sun visor to be balanced when said sun visor is placed on the arm of the rearview mirror, with the third section above the arm and said stop end engaging the arm of the rearview mirror to support the body of the member when the member is placed on the arm.

4,958,880

MOTOR VEHICLE SUNSHIELD

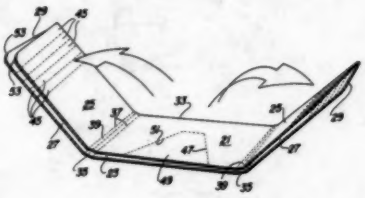
Dean J. Champane, 7001 Chicago Rd., Warren, Mich. 48092

Continuation of Ser. No. 267,799, Nov. 7, 1988, Pat. No. 4,878,708. This application Sep. 22, 1989, Ser. No. 410,851

The portion of the term of this patent subsequent to Nov. 7, 2006, has been disclaimed.

Int. Cl.[5] B60J *3/00*

U.S. Cl. 296—97.7 **4 Claims**



1. In a motor vehicle having a windshield, a dashboard, and a pair of spaced end pillars:

a collapsible sunshield of a corrugated cardboard resilient material having top and bottom edges and a thickness, including a pair of generally symmetrical planar top and bottom sections of the same height having a single horizontal fold line midway of said top and bottom edges;

each section including non-symmetrical central, first and second end panels of general rectangular shape arranged on transverse, laterally spaced parallel fold lines, the panels of both sections being the same height;

the sunshield extending closely adjacent and along said windshield substantially over its height and length with the respective end panels at their ends compressively anchored against said pillars and said bottom section being self-supported upon and along said dashboard and extending upwardly to cover a portion of said windshield;

one of said top and bottom sections being foldable upon said horizontal fold line so as to be superimposed over the other of said sections;

the superimposed first end panels of the top and bottom sections being foldable on said transverse fold lines over the superimposed central panel of the top and bottom sections; and

the superimposed second end panels of the top and bottom sections being foldable on said transverse fold lines over said superimposed first end panels so as to compactly overlie the superimposed central panels of said top and bottom sections.

4,958,881

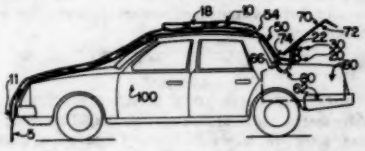
THEFT PROOF PROTECTIVE COVERING FOR PARKED VEHICLE

Ionel Piros, 4461 Mammoth Ave., Sherman Oaks, Calif. 91423

Filed May 31, 1989, Ser. No. 359,645

Int. Cl.[5] B60J *11/00*

U.S. Cl. 296—98 **24 Claims**



1. An assembly for covering a vehicle having a trunk including a forward upper portion and a trunk lid attached at one end by a pair of spaced apart hinges to the upper top end of the trunk, with a gap located between the end of the trunk lid to which the hinges are attached and the upper top of the trunk and extending between the pair of spaced apart hinges, comprising:

a. a protective vehicle cover having an interior surface which lies adjacent to and covers the exterior surface of the vehicle;

b. a rotatable retaining means affixed to said pair of spaced apart hinges and resting within the trunk when the trunk lid is in the closed position and moving with the hinges to an exposed position when the trunk lid is opened; and

c. an interconnecting member having two ends, with one end attached along a transverse line of the interior surface of said protective vehicle cover and the second end attached to said rotatable retaining means, the interconnecting member extending through the gap;

d. whereby when not in use, said protective vehicle cover can be folded up and inserted and retained in said trunk by rotation of said rotatable retaining means causing said vehicle cover to pass through said gap in an opened trunk and when in use, said interconnecting means serves to retain said vehicle cover on said vehicle and prevent theft of the vehicle cover when the trunk is closed.

4,958,882

FOLDING TOP FOR VEHICLES

Eugen Kolb, Stuttgart, Fed. Rep. of Germany, assignor to Dr. Ing. h.c.F. Porsche Aktiengesellschaft, Weissach, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,526

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1988, 3825790

Int. Cl.[5] B60J *7/12*

U.S. Cl. 296—108 **12 Claims**

1. A folding top for vehicles, particularly passenger cars,

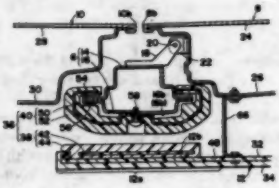
having a front folding top frame and a rear folding top frame and a parallelogram linkage which engages at the rear folding top frame, the parallelogram linkage comprising a main bow and a control lever which are both pivotally connected to a vehicle body, a frameless viewing window extending adjacent to the rear folding top frame, wherein a rear, approximately upright extending edge of the viewing window, in a sealing manner, is in operative connection with a pillar section which is connected with the rear folding top frame by means of a diagonally extending rotating shaft, and wherein the pillar section interacts flexibly, by means of a connecting member, with the control lever in such a manner that, during a swivelling-back of the folding top, a free end of the pillar section carries out a forcibly controlled movement toward an inside of the vehicle body.

4,958,883

AUTOMOTIVE DOOR TRIM MOUNTING STRUCTURE

Tetsuhiro Iwaki, Aki, and Hazime Seikaku, Hiroshima, both of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 31, 1989, Ser. No. 386,592
Claims priority, application Japan, Jul. 29, 1988, 63-99875[U]
Int. Cl.[5] B60J 5/00
U.S. Cl. 296—152 19 Claims



1. An automotive door trim structure comprising: a center pillar disposed between a front door and a rear door and having said rear door hinged to be opened and closed; and a rear door trim including a main body portion mounted to an interior side of said rear door to cover said interior side, and an extension formed at a front end of said main body portion, said extension extending toward said front door so as to cover an interior side of said center pillar.

4,958,884

VEHICLE SAFETY BAR ASSEMBLY

Peter N. Gold, 465 N. Wood Rd., Rockville Centre, N.Y. 11570

Filed Oct. 6, 1989, Ser. No. 417,917
Int. Cl.[5] B62D 31/00
U.S. Cl. 296—188 11 Claims

1. An impact-absorbing vehicle safety bar assembly, mountable within a vehicle panel of the type comprising an outer wall and an inner wall connected via a pair of spaced-apart sidewalls to define an internal cavity which panel is supported between a pair of car pillars, comprising:

a generally normally-bowed, resilient, curvilinear bar having two opposite ends; and

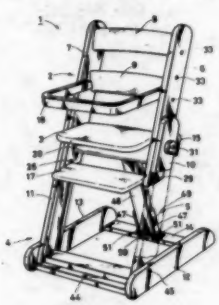
means for mounting said bar within the vehicle panel cavity so that it horizontally spans the cavity of said panel and is outwardly bowed with respect to the vehicle interior whereby, upon impact, said bar tends to deform from its normally bowed condition to a flattened condition, as a result of which its ends are pressed against the sidewalls of the vehicle panel and, in turn, the vehicle pillar, thereby transferring the external impact load laterally towards its ends and, in turn, to said vehicle panel sidewalls and pillars.

4,958,885

HIGH CHAIR

Kenzou Kasai, Osaka, Japan, assignor to Aprica Kasai Kabushikikaisha, Osaka, Japan

Filed Jan. 30, 1986, Ser. No. 880,164
Claims priority, application Japan, Jul. 19, 1985, 60-111291
Int. Cl.[5] A47C 4/00
U.S. Cl. 297—35 9 Claims



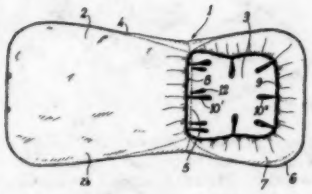
1. A foldable high chair for a child, comprising a seat structure for supporting a child, a support structure for carrying said seat structure, and a position fixing device connected to said support structure for holding said support structure in a raised position for using said chair, said seat structure comprising two flat backrest frame members having first outer surfaces facing away from each other, a seat hinged to and between said two flat backrest frame members, said seat having lateral edges extending in parallel to said two flat backrest frame members in a folded condition of said chair, said first cross means interconnecting said two flat backrest frame members for forming a seat and backrest first frame having a given width between said first outer surfaces, said support structure comprising two flat support frame members having second inner surfaces facing toward each other, second cross means interconnecting said flat support frame members for forming a support structure second frame having a clearance between said second inner surfaces sufficient for receiving said given width of said first frame in said second frame with a sliding fit between said first outer surfaces and said second inner surfaces, and elevation control means (31, 35) operatively arranged for cooperation with said first and second frames for fixing an elevational position of said first frame relative to said second frame, said first frame and said second frame extending upwardly at a same given angle relative to the horizontal so that both frames are in line with each other.

4,958,886

ELASTIC FOLDABLE COVERS FOR MOTORCAR SEATS

Anna Barattini, No. 64, Via S. Maria in Monticelli, and Anna M. Rossi, No. 35, Via Filippo Marchetti, both of Rome, Italy

Filed Aug. 11, 1989, Ser. No. 392,282
Claims priority, application Italy, Sep. 21, 1988, 35914/88[U]
Int. Cl.[5] A47C 31/11
U.S. Cl. 297—229 10 Claims



1. A car seat cover comprising:

a seat back cover portion including a front portion having first and second sides and upper and lower edges, and a rear portion having first and second sides and upper and lower edges, said front portion being connected to said rear portion by a first continuous seam extending along said first and second sides and said upper edges of both of said front and rear portions;

a seat cushion cover portion, having first and second sides and front and rear ends, connected to said front portion by a second continuous seam extending along said lower edge of said front portion and said rear end of said seat cushion cover portion; and

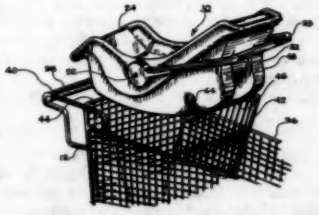
a seat bottom cover portion, having first and second sides and a front end, connected to said seat cushion cover portion by a third continuous seam extending along said first and second sides and said front ends of both said seat bottom cover portion and said seat cushion cover portion, each of said first, second and third continuous seams having a first and a second end, each first end being joined with the other first ends at a first common point and each second end being joined with the other second ends at a second common point.

4,958,887

INFANT CARRIER WITH HOOKS FOR USE WITH SHOPPING CARTS

Paul K. Meeker, Aurora, Ohio, assignor to Spalding & Evenflo Co., Inc., Tampa, Fla.

Filed May 30, 1989, Ser. No. 358,965
Int. Cl.[5] A47D 1/10
U.S. Cl. 297—250 4 Claims



1. An infant carrier adapted to be releasably mounted onto a shopping cart and positively secured thereto comprising in combination:

a main body portion for receiving a child and having a head end and a foot end and a central section therebetween and having side walls with generally vertically extending recesses on the exterior surfaces of the sidewalls and having pockets on the interior surfaces of the sidewalls;

a button positioned within each recess, each button adapted for movement by an operator and with a projection extending inwardly thereof;

a hook positioned within each pocket, each hook having an aperture for receiving one of said projections for movement of the hook with the button for coupling the hooks with a support wire of a shopping cart; and

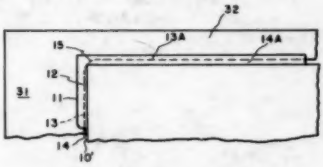
spring means coupling each projection with the base for urging the button and hook to the retracted position to thereby positively secure the hook and carrier with respect to the shopping cart.

4,958,888

LOW STRESS CONCENTRATION CUTOUT COUNTERTOP

Aron Livnah, Glen Mills, Pa., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Aug. 4, 1989, Ser. No. 389,480
Int. Cl.[5] A47B 96/18
U.S. Cl. 312—140.3 7 Claims



1. A countertop having a cutout portion for inserting an appliance which has a flange overlapping the edges of the cutout to support the appliance and hide the cutout, with clearance between the appliance and the edges,

said countertop being substantially horizontally oriented,

said countertop having four sides, one pair of said sides defining opposite edges of said cutout being narrower than the other wider pair of said sides,

each of said corners having a smooth curved cutout portion extending into the wider side to reduce the stress riser effect of the corners,

said curved portion being of a size, shape and position that maximizes its effective stress-relief effect while remaining within the portion of the edge to be covered by the appliance flange.

4,958,889

THREE-POSITION CLOSURE PANEL

Dennis J. Boyle, Menlo Park, and Craig F. Sampson, Palo Alto, both of Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.

Filed Mar. 6, 1989, Ser. No. 319,180
Int. Cl.[5] A47B 21/00
U.S. Cl. 312—208 6 Claims

1. A portable computer comprising:

a chassis having a housing formed of oppositely spaced upper and lower panels having generally rectangularly disposed front, rear and side edges and a peripheral wall extending between and interconnecting said front, rear and side edges of said panels;

a plate mounted on said housing for pivotal movement from a position substantially overlying a rear portion of said peripheral wall that extends between said panel rear edges to a position extending said plate below the level of said lower panel for raising the rear of said housing with respect to the front thereof; and

means for mounting said plate on said housing including oppositely extending pivot pins in said plate adjacent a longitudinal edge of said plate, journal openings in said peripheral wall rear portion mounting said pins for pivotal movement, position-determining cam means including angularly spaced flats formed on said plate, and follower means mounted on said housing cooperable with said cam means for retaining said plate in selected angularly spaced positions.

4,958,890

REFRIGERATOR CABINET FLANGE REINFORCEMENT BAR

Vincent P. Anderson, Center Township, Vanderburgh County, Ind., and Rexford W. Cordill, Galesburg, Ill., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Filed Oct. 30, 1989, Ser. No. 429,792

Int. Cl.[5] A47B *81/00*

U.S. Cl. 312—214 **19 Claims**

1. In a refrigeration apparatus cabinet including a liner forming a space to be refrigerated, said liner having an outwardly turned edge, and an outer shell having opposite sidewalls connected to a top wall, each wall including a turned front edge portion connecting a rear returned portion double reverse bent to form an inwardly opening channel receiving said turned edge of the liner, a cabinet reinforcement comprising:

a pair of elongate flange reinforcement bars each positioned rearwardly of said shell returned portion for one of said sidewalls; and

a body of adhesive disposed between each of said reinforcement bars and its associated shell returned portion defining means for retaining said reinforcement bars in said cabinet.

4,958,891

SPLIT DRAWER ASSEMBLY

Marc D. Taylor, Columbus, Ohio, and Duane Beardsley, Berrien Springs, Mich., assignors to Artromick International, Inc., Columbus, Ohio

Filed May 5, 1989, Ser. No. 348,193

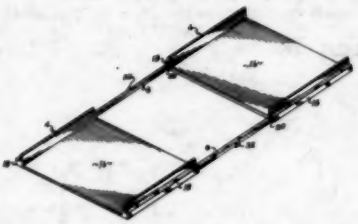
Int. Cl.[5] A47B *81/00*

U.S. Cl. 312—287 **11 Claims**

1. A storage platform for insertion into a frame with slots therein allowing access to the platform from either end of the frame, comprising:

a first section having a platform surface, guides on each side of said platform surface which cooperate with slots in said frame, and a channel within at least one said guide;

a second section opposed to said first section having a platform surface, guides on each side of said platform surface which cooperate with slots in said frame, and a channel within at least one said guide mateable end-on with said channel of said first section; and



a tubular member inserted into each set of said mating channels of said first and second sections, secured therein and slidable within said mating channels, having tabs near both ends thereof to limit travel of said first section relative to said second section.

4,958,892

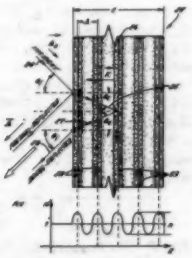
DIFFRACTION COHERENCE FILTER

Tomasz P. Jannson, and Joanna L. Jannson, both of Torrance, Calif., assignors to Physical Optics Corporation, Torrance, Calif.

Filed Oct. 18, 1988, Ser. No. 259,304

Int. Cl.[5] G03H *1/02*

U.S. Cl. 350—3.6 **4 Claims**



2. A method for constructing a diffraction coherence filter from holographic media, said method comprising the steps of:

forming a first layer from the holographic medium;

transmitting electromagnetic energy through said first layer;

reflecting from a surface adjacent said first layer the electromagnetic energy transmitted through said first layer back into the holographic medium of said first layer to form a standing wave pattern therein such that an interference pattern is established in the holographic medium;

forming a second layer comprised of a holographic medium and positioning said second layer at a predetermined distance from said first layer;

transmitting electromagnetic energy through said second layer;

reflecting from a surface adjacent said first layer said electromagnetic energy transmitted through said second layer from said first layer back into the holographic medium of said second layer to create said interference pattern in the holographic medium of said second layer; and

repeating said steps of forming layers comprised of holographic medium and transmitting electromagnetic energy through said layers so formed for reflection from the preceding layer of holographic medium back into said layer so formed to create said interference patterns until a

predetermined number of layers of holographic medium with interference patterns established therein have been formed.

4,958,893

SEMICONDUCTOR LASER BEAM SOURCE APPARATUS

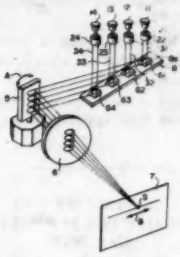
Masaru Noguchi, and Masafumi Yamamoto, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 7, 1986, Ser. No. 837,224

Claims priority, application Japan, Mar. 11, 1985, 60-48076

Int. Cl.[5] G02B *26/08*

U.S. Cl. 350—6.6 **6 Claims**



1. A semiconductor laser beam source apparatus in which laser beams emitted by a plurality of semiconductor lasers, collimated and made parallel to each other are coalesced by a converging lens, wherein said laser beams are respectively reflected by a plurality of reflecting mirrors having reflecting surfaces parallel to each other and guided to said converging lens, and said reflecting mirrors respectively have a mounting surface at a predetermined angle with respect to the reflecting surface and are secured to a common plane.

4,958,894

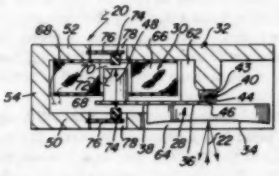
BOUNCING OSCILLATING SCANNING DEVICE FOR LASER SCANNING APPARATUS

Carl H. Knowles, Moorestown, N.J., assignor to Metrologic Instruments, Inc., Bellmawr, N.J.

Filed Jan. 23, 1989, Ser. No. 300,018

Int. Cl.[5] G02B *26/10*

U.S. Cl. 350—6.6 **37 Claims**



1. A beam sweeping apparatus for use in a scanning device, said apparatus comprising a movable member arranged to be oscillated about an axis in an arc for sweeping a beam of light in a predetermined path, said arc having a pair of end points, a pair of stop members located adjacent said movable member to establish the limits of the excursion of said movable member and thereby define said end points of said arc, and reversible moving means comprising energizable means operative to be periodically energized by discrete pulses of electrical energy, one of said discrete pulses causing said movable member to move in one rotational direction until a portion of said movable member engages one of said stop members, whereupon said one stop member prevents further excursion of said movable member in said one rotational direction, said movable member then moving in the opposite rotational direction until a portion of said movable member engages the other of said stop members, whereupon said other of said stop members prevents further excursion of said movable member in said other rotational direction, said moving means then being energized by another of said discrete pulses of electrical energy to again move said movable member in said one rotational direction.

4,958,895

OPTICAL WAVEGUIDES

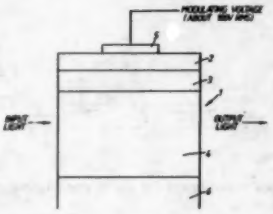
Paul J. Wells, Cambridgeshire, and David Bloor, Brentwood, both of United Kingdom, assignors to GEC-Marconi Limited, Stanmore, United Kingdom

Filed Jun. 23, 1989, Ser. No. 370,307

Claims priority, application United Kingdom, Jun. 24, 1988, 8815087

Int. Cl.[5] G02B *6/10*

U.S. Cl. 350—96.12 **16 Claims**



1. A thin film optical waveguide, comprising a polymeric waveguiding film supported on a substrate, the film comprising a polymer selected from the group consisting of homopolymers of vinylpyridine, homopolymers of derivatives of vinylpyridine in which the pyridine heterocyclic nucleus is substituted, copolymers containing a major proportion of vinylpyridine, and copolymers containing a major proportion of a derivative of vinyl-pyridine in which the pyridine heterocyclic nucleus is substituted.

4,958,896

OPTICAL MULTI-GATE ELEMENT WITH AN ACOUSTO-OPTICAL MODULATOR

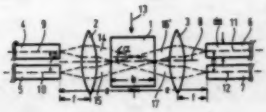
Ernst Brinkmeyer, Buchholz; Manfred Fuchs, Hamburg; Wolfgang Brennecke, Hamburg, and Wilhelm Dargatz, Hamburg, all of Fed. Rep. of Germany, assignors to U.S. Philips Corp., New York, N.Y.

Filed Nov. 4, 1988, Ser. No. 267,158

Claims priority, application Fed. Rep. of Germany, Nov. 6, 1987, 3737634

Int. Cl.[5] G02B *6/10*

U.S. Cl. 350—96.13 **26 Claims**



1. Optical multi-port element with an acousto-optical modulator (AOM), which exhibits at one side at least two optical waveguides having end surfaces disposed in the focal plane of

a lens situated between the optical waveguides and the acousto-optical modulator, comprising a single lens disposed at least on one side of the AOM with its optical axis parallel to the transmission axis of the AOM, and in that the optical waveguides are disposed with their axes parallel to one another and spaced from the optical axis of the lens, the distance, d, between the axes of the optical waveguides being chosen so that light beams emanating from said waveguides and impinging said lens are directed by the lens to the active region of the AOM at the Bragg angle, α, with respect to said AOM optical axis.

4,958,897

THIN FILM OPTICAL COMPONENT FOR USE IN OPTICAL TRANSMISSION LINES AND METHOD OF MANUFACTURING THE SAME

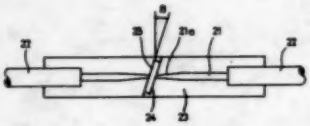
Hisaharu Yanagawa; Toshihiro Ochiai; Hirokazu Hayakawa, and Hidehisa Miyazawa, all of Ichihara, Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jun. 16, 1989, Ser. No. 367,769

Claims priority, application Japan, Jun. 29, 1988, 63-159357; Oct. 27, 1988, 63-269551

Int. Cl.[5] G02B 6/26

U.S. Cl. 350—96.15 **10 Claims**



1. An optical component for use in optical transmission lines, comprising:

an optical fiber having a spot-size enlarged portion in which a spot size is enlarged at an intermediate portion of the optical fiber; and

an optical member comprising a thin film element arranged across said spot-size enlarged portion of the optical fiber, said thin film element including means for optically operating on light transmitted to said spot-size enlarged portion of the optical fiber.

4,958,898

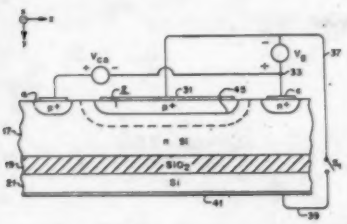
SILICON DOUBLE-INJECTION ELECTRO-OPTIC MODULATOR WITH INSULATED-GATE AND METHOD OF USING SAME

Lionel Friedman, Holden, and Richard A. Soref, Newton Centre, both of Mass., assignors to The United States of America as Represented by the Secretary of the Air Force, Washington, D.C.

Filed Mar. 15, 1989, Ser. No. 323,738

Int. Cl.[5] G02B 6/10; H01L 29/06

U.S. Cl. 350—96.14 **39 Claims**



1. Apparatus for changing the refractive index of a light transmitting semiconductor waveguide having a longitudinal axis comprising:

(a) a light transmitting semiconductor waveguide;

(b) injection means for producing a flow of free carriers along a carrier conduction channel within said light transmitting semiconductor waveguide; and

(c) gate control means for controlling the effective cross-sectional area of said carrier conduction channel by inducing at least one depletion region within said light transmitting semiconductor waveguide.

20. A method of phase modulating a light beam comprising the steps of:

(a) propagating a light beam along the longitudinal axis of a light transmitting semiconductor waveguide;

(b) injecting a flow of free carriers into said light transmitting semiconductor waveguide, overlapping the lowest-order fundamental guided mode optical field of said light beam;

(c) producing at least one depletion region within said light transmitting semiconductor waveguide adjacent to said flow of free carriers; and

(d) altering the size of said depletion region for controlling the effective cross-sectional area of said flow of free carriers.

4,958,899

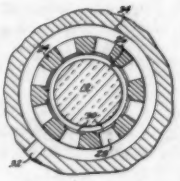
ANNULAR OPTICAL FIBER SUPPORT WITH RADIAL GAS JETS

James R. Rochester, Tucson, Ariz., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 21, 1989, Ser. No. 454,348

Int. Cl.[5] G02B 6/26, 6/00; B23Q 3/00, 3/08

U.S. Cl. 350—96.20 **17 Claims**



10. Apparatus for stabilizing the position of an optical fiber, comprising:

a housing base having an outwardly facing recess therein and a bore extending through the housing base from the bottom of the recess;

a housing plate retainer having an outwardly facing recess therein and a bore extending through the housing base from the bottom of the recess, the housing plate retainer being removably attached to the housing base such that the bore of the housing base is aligned with the bore of the housing plate retainer;

a flow control plate having a bore therethrough, the flow control plate being captured between the housing plate retainer and the housing base at a location such that the bore of the flow control plate is aligned with the bore of the housing base and the bore of the housing plate retainer to form a bore through the entire apparatus, the thickness of the flow control plate being selected such that a portion of the housing plate retainer is spaced apart from the facing portion of the housing base to form an annular plenum around the flow control plate, the flow control plate further having a plurality of etched gas passages therein extending radially from the annular plenum to the bore; and

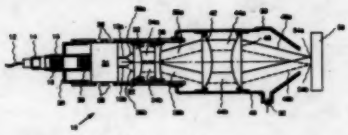
means for providing a flow of gas to the annular plenum.

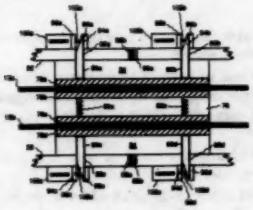
4,958,900

MULTI-FIBER HOLDER FOR OUTPUT COUPLER AND METHODS USING SAME

Angel L. Ortiz, Jr., Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,159
Int. Cl.[5] G02B 6/32
U.S. Cl. 350—96.18 19 Claims





1. A holder for use with a plurality of optical fibers, each optical fiber including an output end portion and an output end, said holder comprising:

a body having a central bore for receiving each fiber output end portion, said body including at least one hole; and

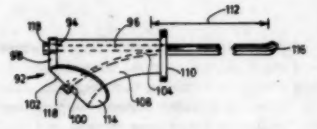
means, disposed in said bore, for adjusting the orientation of at least one optical fiber output end portion with respect to each other optical fiber output end portion thereby adjusting the relative orientation of the output end of the one optical fiber relative to each other output end of each other optical fiber, said adjusting means comprising a screw disposed in said hole and extending into said bore and a spring disposed in said bore for urging the one fiber towards said screw whereby adjusting an extent to which said screw extends into said bore causes a change in the relative orientation of the one optical fiber output end.

4,958,901

METHOD FOR MAKING A MULTI-LUMEN EPIDURAL-SPINAL NEEDLE AND TIP AND STOCK CONFIGURATION FOR THE SAME

Dennis W. Coombs, Etna, N.H., assignor to Neurodelivery Technology, Inc., Tempe, Ariz.

Continuation-in-part of Ser. No. 72,428, Jul. 13, 1987, Pat. No. 4,808,157. This application Feb. 27, 1989, Ser. No. 316,037
Int. Cl.[5] A61M 3/00
U.S. Cl. 604—44 18 Claims



7. An improved needle stock for a epidural-spinal needle having a bonded region where an epidural lumen and an introducer lumen are bonded and an unbonded region where the lumina diverge, the improvement comprising:

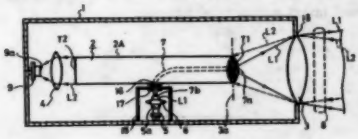
a face plate having first reference surface with a first passage there through and a second reference surface with a second passage there through, said second reference surface being inclined with respect to the first reference surface such that the epidural lumen will pass through said first reference surface substantially normal to said first reference surface and the introducer lumen will pass through said second reference surface substantially normal to said second reference surface.

4,958,902

OPTICAL SPACE TRANSMISSION APPARATUS

Yujiro Ito, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

PCT No. PCT/JP88/00198, § 371 Date Oct. 25, 1988, § 102(e) Date Oct. 25, 1988, PCT Pub. No. WO88/06740, PCT Pub. Date Sep. 7, 1988
PCT Filed Feb. 25, 1988, Ser. No. 269,661
Claims priority, application Japan, Feb. 27, 1987, 62-28483
Int. Cl.[5] G02B 6/32
U.S. Cl. 350—96.18 7 Claims



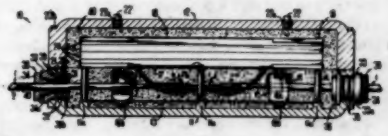
1. An optical space transmission apparatus for use in conjunction with an optical space transmission line over which light information signals can be sent or received, and being of the type which includes a light emitting element for generating light signals to be transmitted over the optical space transmission line, a light receiving element for detecting light received from the optical space transmission line, a transmission/reception common lens which is optically coupled to the optical space transmission line, and a transmission/reception light splitter optically connecting the transmission/reception common lens with the light emitting element and the light receiving element, wherein the improvement comprises that the transmission/reception light splitter includes at least one optical fiber and in that one end portion of the optical fiber is positioned near the focal plane of the transmission/reception common lens and near, or on its optical axis, and the other end of the optical fiber is optically coupled to the light emitting element whereby light transmitted or received by the apparatus is spatially split near the end portion of the optical fiber which is closest to the transmission/reception common lens.

4,958,903

SPLICE CLOSURE

Gary S. Cobb, Norcross, and Phillip M. Thomas, Lake City, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 9, 1988, Ser. No. 282,811
Int. Cl.[5] G02B 6/36, 7/26
U.S. Cl. 350—96.20 6 Claims



1. A cable splice closure comprising:

an upper housing;

a lower housing having end portions comprising:

circular cable entrances to the lower housing interior;

and a plurality of fixed mounting means extending from the surface of said lower housing interior;

an end-seal assembly for introducing a cable into said lower housing interior and sealing each of said entrances, each said assembly comprising:

insert means having an axial passage and an exterior surface extending through said lower housing entrance;

first sealing means disposed on said exterior surface and contacting said lower housing entrance;

second sealing means for contacting a cable contained in said passage;

locking means mounted into said passage and having an axial passage and an interior end, for compressing said second sealing means onto a cable; and

retaining means engaging said insert means exterior surface and said lower housing end portions;

means secured to said lower housing fixed mounting means for containing in layered relation a plurality of splices; and

means for anchoring to the interior floor mounting means for housing, respective ends of a cable extending through said insert means axial passage.

4,958,904

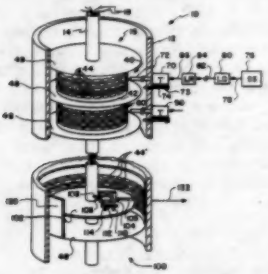
OPTICAL SLIP RING

John M. Rawski, Maple Grove, Minn., assignor to Honeywell, Inc., Minneapolis, Minn.

Filed Oct. 23, 1987, Ser. No. 112,317

Int. Cl.[5] G02B 6/36

U.S. Cl. 350—96.20 **17 Claims**



1. An optical slip ring comprising: first and second relatively rotatable members; a source of first frequency, binary coded pulses;

a single optical fiber having a first end connected to the source to receive the pulses and having a second end operable to transmit a beam of radiation which fluctuates at the first frequency in accordance with the binary code;

a plurality of radiation detectors connected in parallel and spaced on the first member in a pattern of alternate rows of detectors with each row being offset from adjacent rows so that at least one of the detectors will receive the beam when the members are rotating, regardless of their relative position; and

adjustable means mounting the fiber on the second member to adjust the distance between the second end of the fiber and the detectors to restrict the spread of the beam.

4,958,905

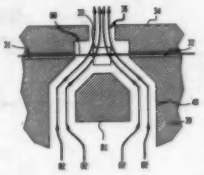
METHOD AND APPARATUS FOR FORMING HIGH STRENGTH SPLICES IN OPTICAL FIBERS

Arthur R. Tynes, 120 Bruce Rd., Red Bank, N.J. 07701, and Eric W. Mies, 25 Canyon Woods, Matawan, N.J. 07747

Filed Jun. 19, 1989, Ser. No. 368,260

Int. Cl.[5] G02B 6/38

U.S. Cl. 350—96.21 **16 Claims**



1. A method for splicing a pair of silicon based optical fibers comprising the steps of:

holding an end of each of two optical fibers to be spliced in a corresponding one of a pair of longitudinally-spaced coaxially-aligned grooves formed in a heat treating holder;

coaxially aligning the ends of said fibers held in the heat treating holder;

heating said fiber ends situated in a region between said grooves in said heat treating holder to a temperature sufficiently high to fuse said fibers together; and

directing, simultaneously with said heating, a flowing non-reactive or inert gas through said region over the ends of the fibers in order to remove evaporated silicon therefrom.

4,958,907

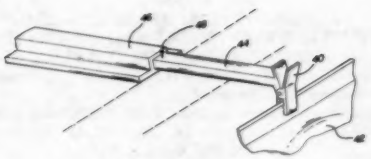
COMPUTER SCREEN MAGNIFIER

Dale G. Davis, 8228 Paige, Warren, Mich. 48089

Filed Jan. 17, 1989, Ser. No. 297,038

Int. Cl.[5] G02B 7/02

U.S. Cl. 350—243 **4 Claims**



1. A holder for adjustable positioning a flat sheet magnifier proximate a video display terminal comprising:

mounting means for retaining said magnifier, said mounting means including a spring biased clamping device for securely holding said magnifier thereto; and

means for supporting and extensibly positioning said mounting means in a predetermined, spaced-apart relationship with said terminal, said means including at least one support arm having said clamping device disposed at one end thereof, and a flat, rectangular retaining block securedly affixed to said terminal.

4,958,908

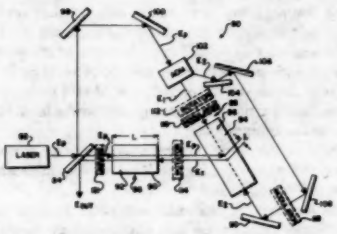
BANDWIDTH-PRESERVING BRILLOUIN PHASE CONJUGATE MIRROR AND METHOD

Davis A. Rockwell, Santa Monica; Richard C. Lind, Woodland Hills, and David M. Pepper, Malibu, all of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Mar. 15, 1989, Ser. No. 323,649

Int. Cl.[5] G02B *27/10*

U.S. Cl. 350—311 **19 Claims**



1. A method of generating a narrow bandwidth output optical beam as a phase conjugated reflection of a narrow bandwidth input optical beam, comprising the steps of:

(a) splitting a narrow bandwidth coherent optical beam from a laser source into a first component constituting the input beam and second and third components constituting first and second reference beams respectively;

(b) applying the input beam through a Brillouin amplifier to a four wave mixer, which includes a nonlinear medium, to generate a phase conjugated optical seed beam in counterpropagation with the input beam;

(c) downshifting the frequency while preserving the narrow bandwidth of either the first or second reference beam by a Stokes frequency of the nonlinear medium in the four wave mixer;

(d) directing the first and second reference beams into the four wave mixer in counterpropagation with each other; and

(e) applying the seed beam to the Brillouin amplifier to transfer energy from the input beam to the seed beam and thereby amplify the seed beam to constitute the output beam.

4,958,909

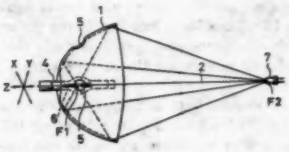
METHOD OF ADJUSTING LIGHT SOURCE POSITION IN CONVERGENCE DEVICE EMPLOYING SPHEROIDAL MIRROR

Nobuhiko Kubo, Hino, Japan, assignor to Yamashita Denso Corporation, Tokyo, Japan

Filed Nov. 30, 1989, Ser. No. 443,309

Int. Cl.[5] G02B *5/10*

U.S. Cl. 350—320 **2 Claims**



1. A method of adjusting a light source position in a convergence device having a spheroidal mirror and a discharge tube disposed within said spheroidal mirror, such that the vicinity of a tip of a cathode of the discharge tube is generally aligned with a first focal point of the spheroidal mirror whereby light from the discharge tube converges at a second focal point, and wherein two peep holes are provided in the spheroidal mirror at locations corresponding to a plane surface including said first focal point and perpendicular to an optical axis of the spheroidal mirror, wherein in said peep holes are offset by 90 degrees with respect to one another in said plane surface, said method including the steps of:

projecting light from a point source or an optical fiber light guide from said second focal point toward said spheroidal mirror, such that said projected light converges at said first focal point, when said discharge tube is off;

observing said projected light and said discharge tube through said two peep holes; and

adjusting the position of the discharge tube based upon the observed position of the projected light and the discharge tube from said two peep holes, such that the vicinity of the tip of the cathode of the discharge tube is aligned with said first focal point.

4,958,910

RADIATION PULSE GENERATION

James R. Taylor, London, Great Britain; Anderson S. L. Gomes, Recife, and Artur D. Gouveia-Neto, Maecio, both of Brazil, assignors to British Telecommunications public limited company, Great Britain

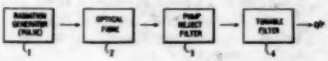
PCT No. PCT/GB88/00260, § 371 Date Jan. 31, 1989, § 102(e) Date Jan. 31, 1989, PCT Pub. No. WO88/08150, PCT Pub. Date Oct. 20, 1988

PCT Filed Mar. 31, 1988, Ser. No. 282,219

Claims priority, application United Kingdom, Apr. 6, 1987, 8708148

Int. Cl.[5] G02B *27/00, 6/26*

U.S. Cl. 350—321 **8 Claims**



1. A radiation pulse generating assembly comprising: a radiation generator for generating pulses of radiation; a waveguide into which pulses of radiation at working intensities from the radiation generator are coupled, the waveguide causing the radiation pulses to undergo Raman scattering to generate reduced width pulses with wavelengths lying within a Raman spectrum; and filtering means into which the reduced width pulses are coupled for selecting reduced width pulses within a desired wavelength band.

4,958,911

LIQUID CRYSTAL DISPLAY MODULE HAVING HOUSING OF C-SHAPED CROSS SECTION

John L. Beiswenger, Salem, Wis., and Darrell N. Chelcun, Buffalo Grove, Ill., assignors to Jonand, Inc., Chicago, Ill.

Filed Oct. 19, 1988, Ser. No. 259,802

Int. Cl.[5] G02F *1/13*; H03K *5/02*

U.S. Cl. 350—331 R **34 Claims**

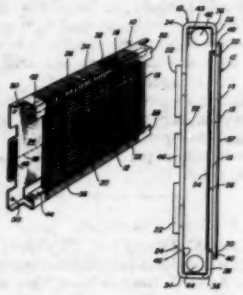
13. A liquid crystal display module which comprises:

a liquid crystal display comprising liquid crystal material entrapped in a substantially planar area;

a housing of essentially C-shaped cross-section, said liquid

crystal display being attached to opposed ends of the C-shaped cross-section of said housing;

electronic control means positioned on said housing, said electronic control means being carried on the side of said housing which is opposed to said liquid crystal display; conductor means carried by said housing and providing electronic communication between said electronic control



means and said liquid crystal display; at least part of said conductor means extending about an exterior curved surface portion of said housing defined by said C-shaped cross-section; and

said housing carrying, within said C-shaped cross-section, light producing means comprising at least one light source to provide back illumination of said liquid crystal display.

4,958,912

IMAGE FORMING APPARATUS

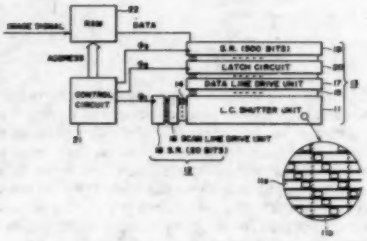
Yutaka Inaba, Kawaguchi; Hideyuki Kawagishi, Fujisawa; Makoto Kojima, Hino, and Shuzo Kaneko, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

Filed Jul. 6, 1988, Ser. No. 215,791

Claims priority, application Japan, Jul. 7, 1987, 62-167835; Jul. 31, 1987, 62-191864

Int. Cl.[5] G02F 1/13; G09G 3/00

U.S. Cl. 350—333 **16 Claims**



1. An image forming apparatus comprising:

a light source;

an optical shutter unit comprising a pair of parallel substrates respectively having a plurality of scanning electrodes and a plurality of data electrodes disposed to intersect with each other to form a matrix electrode structure on opposite surfaces thereof and a ferroelectric liquid crystal disposed between said pair of substrates so as to form respective microshutters at each intersection of said scanning electrodes and said data electrodes, wherein said microshutters are arranged in a plurality of rows corresponding to said plurality of scanning electrodes;

an optical system for forming an image at a desired position with light transmitted through said optical shutter unit;

a photosensitive member;

a scanning line drive circuit for applying scanning voltage signals to said plurality of scanning electrodes so as to sequentially select at least one scanning electrode in a prescribed cycle;

a data line drive circuit for applying data voltage signals to said plurality of data electrodes in synchronism with said scanning voltage signal;

means for applying first image data to first ones of said microshutters on a first particular scanning electrode in a first scanning cycle and applying second image data associated with said first image data to provide desired gradation of the image to second ones of said microshutters on a second particular scanning electrode in a subsequent second scanning cycle;

means for controlling the scanning line drive circuit to provide different opening periods to said microshutters in respective rows; and

means for moving said photosensitive member so that a particular position on said photosensitive member corresponds to said first particular scanning electrode in the first scanning cycle, the particular position further corresponding to said second particular scanning electrode in the second scanning cycle.

4,958,913

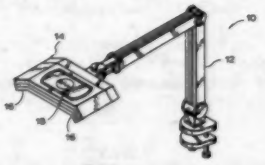
MAGNIFIER LENS ASSEMBLY

Irving Schaffer, Fairfield, Conn., assignor to Luxo Lamp Corporation, Port Chester, N.Y.

Filed Oct. 31, 1988, Ser. No. 265,042

Int. Cl.[5] G02B 7/02; F23Q 3/00

U.S. Cl. 350—252 **12 Claims**



1. A magnifier lens assembly mounted within a lamp head comprising:

a barrel housing; and

first, second and third lenses, each of said lenses having a convex surface, an opposing substantially planar surface and a center axis of symmetry of said convex surface;

said first, second and third lenses being mounted successively and coaxially within said barrel housing with the convex surface of said first lens facing the convex surface of said second lens, and the substantially planar surface of said second lens facing the convex surface of said third lens, and

means cooperating with said housing for securing the lenses in relatively fixed relation to each other and for securing said magnifier lens assembly within said lamp head; each of said first, second and third lenses being a circular plano-convex lens; said lamp head including a relatively flat mounting surface therein cooperating with said securing means for securing said assembly to the lamp head; said mounting surface having an opening formed therein; and said mounting surface being a sheet of transparent material.

4,958,914

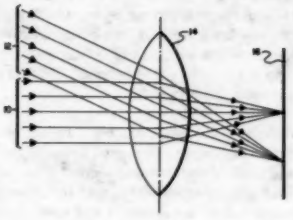
OPTICAL INTENSITY-TO-POSITION MAPPING AND LIGHT DEFLECTOR APPARATUS AND METHOD

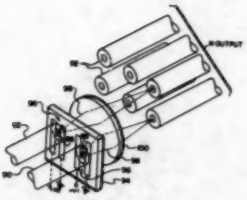
Yuri Owechko, Newbury Park, and Bernard H. Soffer, Pacific Palisades, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Continuation-in-part of Ser. No. 879,719, Jun. 27, 1986, abandoned, and a continuation-in-part of Ser. No. 900,053, Aug. 25, 1986, abandoned. This application May 24, 1988, Ser. No. 198,018

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—342 **7 Claims**





1. An optical intensity mapping apparatus comprising:

an array of modules formed from an electro-optic material comprising liquid crystals, said array of modules comprising an array of voltage gradient modules established in a layer of the electro-optic material,

means for establishing a variable spatial voltage gradient across the layer of electro-optic material in a gradient direction transverse to the input light so as to establish said array of voltage gradient modules, comprising an array of interdigitated electrodes on one side of the layer of electro-optic material, a counter electrode on the other side of the layer of electro-optic material, and voltage source means for applying voltages to the interdigitated electrodes and the counter electrode to establish spatial voltage gradients therebetween, the counter electrode comprising a substantially continuous electrode opposed to the array of interdigitated electrodes,

the voltage source means being connected to supply a first voltage to alternate electrodes of the interdigitated electrodes, and a second voltage in common to the intervening interdigitated electrodes and to the counter electrode,

means for receiving an input light beam whose optical intensity varies as a function of position within the beam,

means for spatially and temporally varying the voltage gradient of each module of said array of modules in accordance with the optical intensities at corresponding locations in the beam, said means for spatially and temporally varying comprising a layer of voltage modification material between the counter electrode and the electro-optic material, the voltage modification material being adapted to modify the module voltage gradients across the electro-optic layer in accordance with the optical intensities of the received light at locations corresponding to the respective modules,

means for producing optical outputs from each module in directions which vary in accordance with the variations in the voltage gradient, such that the input optical intensities are mapped onto the directions of the optical outputs from each of the modules, and

focusing means in the path of the optical outputs adapted to focus the directionally-mapped outputs to a positional mapping of the input beam intensities.

4,958,915

LIQUID CRYSTAL APPARATUS HAVING LIGHT QUANTITY OF THE BACKLIGHT IN SYNCHRONISM WITH WRITING SIGNALS

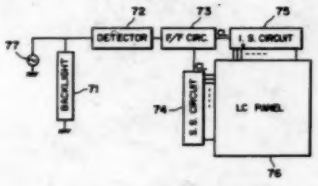
Shinjiro Okada, Kawasaki; Tohru Takahashi, Tokyo; Hideyuki Kawagishi, Tokyo; Yutaka Inaba, Kawaguchi, and Osamu Taniguchi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

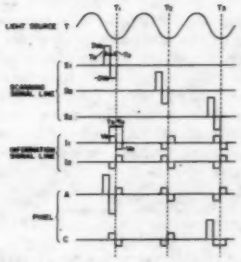
Continuation of Ser. No. 881,384, Jul. 2, 1986, abandoned. This application Feb. 13, 1989, Ser. No. 309,974

Claims priority, application Japan, Jul. 12, 1985, 60-152320; Oct. 21, 1985, 60-233563; Oct. 21, 1985, 60-233564; Oct. 21, 1985, 60-233565; Oct. 29, 1985, 60-240663

Int. Cl.[5] G02F 1/133

U.S. Cl. 350—345 **16 Claims**





1. A liquid crystal apparatus, comprising:

a liquid crystal panel comprising a plurality of scanning lines, a plurality of information signal lines, and an plurality of picture elements disposed along each of the scanning lines and comprising a ferroelectric liquid crystal;

a backlight disposed behind the liquid crystal panel for illuminating the liquid crystal panel, said backlight changing the light quantity emitted therefrom with the lapse of time at least between a low level and a high level; and

means for synchronizing the low level of the light quantity of the backlight with a writing period when a selection scanning signal is sequentially applied to said scanning lines in phase with information signals to provide a writing voltage signal of one or the other polarity exceeding a threshold of the ferroelectric liquid crystal, a nonwriting voltage not exceeding the threshold being applied in a

nonwriting period when at least one of the selection scanning signal and the information signal is not applied to the signal lines, and wherein the light quantity assumes the high level when both the selection scanning signal and the information signal are not applied to the signal lines.

4,958,916

SURFACE STABILIZED FERROELECTRIC LIQUID CRYSTAL DEVICES

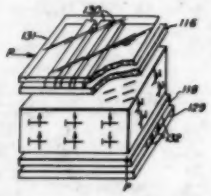
Noel A. Clark, 3106 Kittrell Court, Boulder, Colo. 80303, and Sven T. Lagerwall, 30 Snackvagen, Goteborg, Sweden

Division of Ser. No. 225,464, Jul. 28, 1988, Pat. No. 4,840,463, which is a division of Ser. No. 88,482, Aug. 19, 1987, Pat. No. 4,813,767, which is a continuation of Ser. No. 797,021, Nov. 12, 1985, abandoned, which is a division of Ser. No. 511,733, Jul. 7, 1983, Pat. No. 4,563,059, which is a continuation-in-part of Ser. No. 456,844, Jan. 10, 1983, abandoned, which is a continuation of Ser. No. 110,451, Jan. 8, 1980, Pat. No. 4,367,924. This application Mar. 3, 1989, Ser. No. 318,762

The portion of the term of this patent subsequent to Jan. 11, 2000, has been disclaimed.

Int. Cl.[5] G02F 1/13

U.S. Cl. 350—350 S **12 Claims**



1. A liquid crystal device comprising:

a pair of substrates; and

a ferroelectric liquid crystal having a plurality of layers each comprised of a plurality of molecules, each molecule having a long axis, the long axes of said molecules in a bulk forming helices, said ferroelectric liquid crystal being disposed between said pair of substrates which are spaced by a distance sufficiently small to suppress the formation of said helices, said plurality of layers being aligned parallel to each other in one direction within the planes of said substrates, and said substrates and said ferroelectric liquid crystals causing an orientation state of said molecular long axes which corresponds to any of a plurality of different stable states.

4,958,917

ELECTROCHROMIC DEVICE FOR CONTROLLING TRANSMITTANCE OF LIGHT

Chikara Hashimoto, Omiya; Hiroshi Inaba, Matsusaka; Kiyoshi Nakase, Mie, and Yukitoshi Yanagida, Matsusaka, all of Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jan. 23, 1989, Ser. No. 299,418

Claims priority, application Japan, Jan. 29, 1988, 63-9684[U]

Int. Cl.[5] G02F 1/01

U.S. Cl. 350—357 **3 Claims**

1. An electrochromic device for controlling transmittance of light, comprising:

a transparent inner substrate with a transparent electrode layer coated on each side thereof;

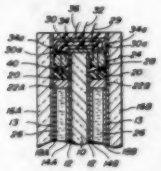
first and second electrochromic layers which are formed on the electrode layers on the two opposite sides of said inner substrate, respectively, and are formed of one of a first electrochromic material which takes on a characteristic color in its electrochemically oxidized state and a second electrochromic material which takes on a characteristic color in its electrochemically reduced state;

a transparent first outer substrate which is coated with a transparent electrode layer and is arranged opposite to and spaced from said inner substrate such that the electrode layer of the outer substrate faces the first electrochromic layer, the outer substrate being dimensioned larger than said inner substrate;

a transparent second outer substrate which is coated with a transparent electrode layer and is arranged opposite to and spaced from said inner substrate such that the electrode layer of the second outer substrate faces the second electrochromic layer, the second outer substrate being dimensioned larger than said inner substrate;

third and fourth electrochromic layers which are formed on said electrode layer on said first outer substrate and said electrode layer on said second outer substrate, respectively, and are formed of the other of said first and second electrochromic materials;

a first peripheral seal formed of a butyl rubber base adhesive composition disposed in the space between the inner substrate and each of the first and second outer substrates so as to hold the inner substrate and the first and second outer substrates in the opposite and spaced arrangement and airtightly define a first space between the inner substrate and the first outer substrate and a second space between the inner substrate and the second outer substrate and forming a peripheral gap between the first and second outer substrates, a peripheral region of the inner substrate protruding into said peripheral gap;



an electrolyte liquid which fills up said first space and said second space;

a first connector which is an angled strip of a sheet metal having two parallel leg portions and is fitted on said inner substrate such that said two parallel legs are respectively fixed to the transparent electrode layers on the two opposite sides of said inner substrate;

a second connector which is an angled strip of a sheet metal having two parallel leg portions and is fitted into a marginal region of the space between said first and second outer substrates such that said two parallel leg portions are respectively fixed to the transparent electrode layer on said first outer substrate and the transparent electrode layer on said second outer substrate;

a second seal formed of polysulfide rubber filling said peripheral gap such that said first connector and at least said leg portions of said second connector are embedded in the second seal;

a first lead which extends outward from said first connector through said first and second seals; and

a second lead which extends outward from said second connector.

4,958,918
OPTICAL SIGNAL CONTROL METHOD AND APPARATUS

Nigel G. Walker, Ipswich, England, assignor to British Telecommunications public limited company, United Kingdom

PCT No. PCT/GB88/00282, § 371 Date Jan. 3, 1989, § 102(e) Date Jan. 3, 1989, PCT Pub. No. WO88/08147, PCT Pub. Date Oct. 20, 1988
PCT Filed Apr. 13, 1988, Ser. No. 294,069
Claims priority, application United Kingdom, Apr. 16, 1987, 8709247
Int. Cl.[5] G02F 1/07, 1/09
U.S. Cl. 350—378 35 Claims

3. Apparatus for processing one or more optical signals to produce a desired polarisation transformation comprising:

at least one variable birefringent device adapted to provide a rotation of variable amount on the Poincaré sphere about an axis, or effective axis, of rotation which itself may be varied in direction in a plane which passes through the origin of the Poincaré sphere and

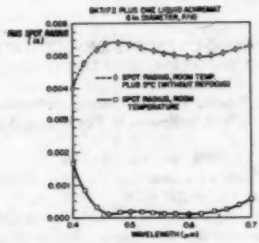
control means adapted to vary the amount of rotation on the Poincaré sphere produced by the birefringent device, and to vary the direction of the axis or effective axis about which the rotation takes place, so as to achieve the desired polarisation transformation;

and wherein said control means is arranged to vary the direction of the axis of rotation on the Poincaré sphere in such a manner as to prevent substantially the magnitude of the birefringence introduced by the device exceeding 2π or a chosen multiple of 2π.

4,958,919
COLOR-CORRECTED OPTICAL SYSTEMS WITH LIQUID LENS ELEMENTS

Robert D. Sigler, Cupertino, Calif., assignor to Lockheed Missiles & Space Company, Inc., Sunnyvale, Calif.

Continuation of Ser. No. 260,106, Oct. 20, 1988, abandoned.
This application Dec. 11, 1989, Ser. No. 449,439
Int. Cl.[5] G02B 1/06
U.S. Cl. 350—418 7 Claims

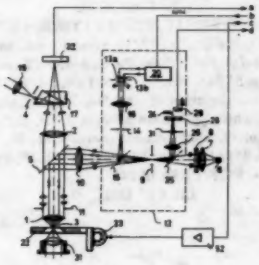


1. A color-corrected optical system comprising a plurality of refractive elements, a first one of said refractive elements consisting of a substantially rigid optical material, a second one of said refractive elements consisting of a substantially fluidal optical material, said optical materials including at least one material having a substantially normal dispersion and at least one material having a substantially abnormal dispersion, said optical materials being compatible with each other so as to enable color correction to be achieved for at least three wavelengths.

4,958,920
PROCESS AND APPARATUS FOR THE AUTOMATIC FOCUSING OF MICROSCOPES

Reinhard Jorgens, Oberkochen, and Bernd Faltermeier, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Aug. 18, 1989, Ser. No. 395,769
Claims priority, application Fed. Rep. of Germany, Aug. 20, 1988, 3828381
Int. Cl.[5] G02B 21/26; G01J 1/20
U.S. Cl. 350—530 12 Claims



1. A method for the automatic focusing of a microscope having a stage for holding an object to be viewed by an objective lens, said stage and said lens being movably adjustable relative to each other by a focusing drive, and also having both active and passive focusing apparatus, comprising the steps of:

a. activating said active focusing apparatus to generate a first focusing signal;

b. operating said focusing drive in response to said first signal to adjust the distance between lens and stage to a first focus position;

c. activating said passive focusing apparatus to generate a second focusing signal having a varying value;

d. operating said focusing drive to vary the distance between stage and lens from said first focus position by moving one relative to the other through a search pass; and

e. stopping said focusing drive at a final focusing position responsive to a predetermined value of said second signal.

4,958,921
LIGHT-DRIVEN PHASE SHIFTER

James W. Early, Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Sep. 19, 1986, Ser. No. 909,746
Int. Cl.[5] G02B 5/172, 6/36
U.S. Cl. 350—354 7 Claims

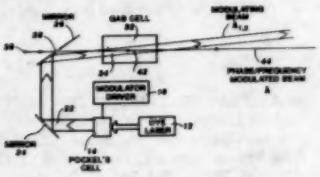
1. A light driven phase shifter, comprising:

a modulating chamber having a gas with at least three electron energy states including a ground state, a metastable state, and a transition state having a transition energy from said metastable state, corresponding to a first light wavelength;

first light means for illuminating said modulating chamber with modulating light at said first wavelength along a first beam path, said first beam path defining a volume of said

gas having an index of refraction determinable by an intensity of said first light means;

second light means for illuminating said modulating chamber with a transmission light beam along a second beam



path traversing at least a portion of said first beam path; and

means for varying said intensity of said first light means effective to vary said gas index of refraction for phase shifting said transmission light.

4,958,922

UNIVERSAL VISION CORRECTOR

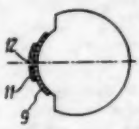
Paul Binh, 17, rue Dailly, 92210 Saint-Cloud, and Paul Blanié, 282, rue St-Jacques, 75006 Paris, both of France

Continuation of Ser. No. 133,258, Dec. 14, 1987, abandoned, which is a continuation of Ser. No. 752,193, Jun. 24, 1985, abandoned. This application Mar. 6, 1989, Ser. No. 319,904

Claims priority, application France, Oct. 28, 1983, 831244; Jul. 19, 1984, 8411447; Oct. 12, 1984, 8400388; PCT Int'l Appl., Oct. 26, 1984, PCT/FR84/00244

Int. Cl.[5] G02C *7/16*

U.S. Cl. 351—46 **38 Claims**



1. An apparatus for correcting vision using at least one lens, comprising: at least one transparent zone situated on the axis of vision of each said lens, said transparent zone having a surface area of between about 0.2 and 3.5 mm^2; and at least one opaque zone surrounding said transparent zone, said opaque zone having an average diameter of between about 3 and 8 mm.

4,958,923

APPARATUS FOR DECORATING AN EYEGLASS FRAME

Andrew S. Rosenson, 3705 W. Greenwood, Skokie, Ill. 60076

Filed Feb. 24, 1989, Ser. No. 315,150

Int. Cl.[5] G02C *11/02, 7/08, 1/04*

U.S. Cl. 351—52 **14 Claims**

1. An apparatus for decorating an eyeglass frame, said eyeglass frame having a width and a height, said width being greater than said height; said eyeglass frame further having a frame member defining a pair of eyepiece receiving means for receiving lenses; said eyeglass frame further having an edge and a plurality of protuberances arrayed along said edge; the apparatus comprising a decorative frame member having integral engagement means for removably affixing said decorating frame member to said eyeglass frame, said engagement means comprising at least one upper engagement member and at least one lower engagement member, said at least one upper engagement member comprising a channel depending from a first face of said decorating frame, said channel having a width appropriate for nestingly engaging said eyeglass frame, said channel also having a groove for receiving said plurality of protuberances when said decorating frame is affixed to said eyeglass frame, said at least one lower engagement member depending from said first face and configured for snappingly engaging said eyeglass frame when said eyeglass frame is nestingly engaged in said channel and said decorating frame member is urged against said eyeglass frame, with at least said one upper engagement member and said at least one lower engagement

member cooperating to engage said eyeglass frame across said height to removably affix said decorating frame to said eyeglass frame.

4,958,924

LOW VISION EYE GLASSES

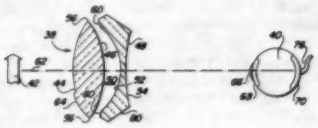
William S. Parker, 3210 Corrine Dr., Orlando, Fla. 32803

Continuation-in-part of Ser. No. 777,829, Sep. 9, 1985, Pat. No. 4,772,113. This application Sep. 1, 1988, Ser. No. 239,449

The portion of the term of this patent subsequent to Sep. 20, 2005, has been disclaimed.

Int. Cl.[5] G02C *7/06, 7/08*

U.S. Cl. 351—57 **8 Claims**



1. A method of enhancing visual acuity in a person suffering from severe vision deterioration due to loss of light response in portions of the person's retina, the method comprising the steps of:

converging image bearing light rays from an object being viewed to form a magnified image of the object;

diverging the magnified image to correct for magnification;

focusing the diverged image onto optically responsive portions of a person's retina;

directing additional ambient light onto the person's retina for enhancing image response by:

i. providing a diverging lens; and

ii. forming a prism ring circumscribing a surface of the diverging lens and positioned so as to direct ambient light toward the person's retina.

4,958,925

EYE MOVEMENT MEASUREMENT DEVICE WITH MULTIPLE LIGHT EMITTING AND DETECTING ELEMENTS

Jan K. Ober, Poznan, Poland, and Per Udden, Hofstrasse 1, Ch-6064 Kerns, Switzerland, assignors to Per Udden, Kerns, Switzerland

Filed Sep. 14, 1988, Ser. No. 244,160

Claims priority, application Sweden, Sep. 21, 1987, 8703639

Int. Cl.[5] A61B *3/14*

U.S. Cl. 351—210 **8 Claims**

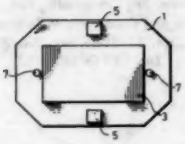
1. A device for measuring the movements of an eye, comprising:

a supporting frame having an aperture;

a first pair of light emitting elements arranged on opposite sides of said supporting frame and located in a first plane;

a first pair of light detecting elements arranged on opposite sides of said supporting frame and located in a second plane which is orthogonal to said first plane; and

wherein said first pair of light emitting elements and said first pair of light detecting elements are arranged symmetri-



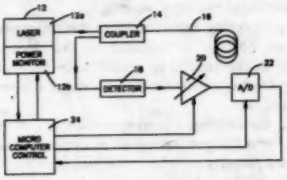
cally about said eye and cooperate in detecting movement of said eye.

4,958,926

CLOSED LOOP CONTROL SYSTEM FOR LASER

George Bu-Abbud, Plano, Tex., assignor to Reliance Comm/Tec Corporation, Chicago, Ill.

Filed Oct. 31, 1988, Ser. No. 264,356
Int. Cl.[5] G01N *21/88*; H01S *3/133*
U.S. Cl. 356—73.1 **17 Claims**



1. An instrument comprising:
(a) laser means responsive to a current pulse for generating output light to an optical fiber;
(b) means for detecting light from said fiber when said laser means output light is connected to said fiber and generating an electrical signal having an amplitude whose range is related to the intensity range of said light;
(c) means having a predetermined operating range and an adjustable gain for providing an output signal having an amplitude range which is said electrical signal amplitude range multiplied by said adjustable gain;
(d) means for determining when said output signal amplitude range is not substantially equal to said predetermined operating range; and
(e) means responsive to said determining means for continuously controlling said adjustable gain and the amplitude of said current pulse to thereby change said output signal amplitude range so that it is substantially equal to said predetermined operating range.

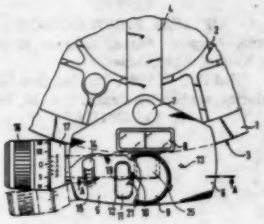
4,958,927

OPTICAL ANGLE MEASURING INSTRUMENT

Gerd Finnern, Hamburg, Fed. Rep. of Germany, assignor to C. Plath Fabrik Nautischer Instrumente, Del.X

Filed Jan. 23, 1989, Ser. No. 299,873
Claims priority, application Fed. Rep. of Germany, Jan. 20, 1988, 3801553
Int. Cl.[5] G01B *11/26*; G01C *1/08*
U.S. Cl. 356—140 **8 Claims**

1. In an optical angle measuring instrument of the type that includes an alhidade that is pivotally mounted on a limbus and has a free end, a measuring drum that is pivotally articulated on the free end of the alhidade perpendicularly to the axis of an alhidade bearing and having a drum screw engaged to a limbus toothing, the improvement comprising:
(a) a manually rotatable switching member;
(b) said member being mounted on said alhidade and rigidly connected to a switching pin passing through a slot in an alhidade plate;
(c) said pin being located eccentrically with respect to a switching member mount;
(d) said pin being so located that said drum screw, under the action of a stop element, is switchable between two stable



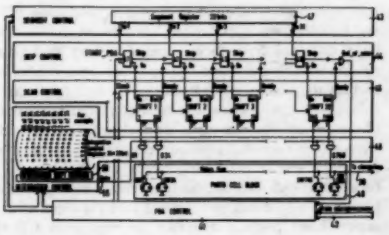
stop locations in response to rotation of said switching member; and
(e) said drum screw being arranged to engage said limbus toothing in one stop location and to disengage said limbus toothing in said other location to permit said alhidade to pivot freely.

4,958,928

PHOTODIODE ARRAY SPECTROMETER

Hubert Kuderer, Waldbronn, Fed. Rep. of Germany, assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Apr. 14, 1989, Ser. No. 338,265
Claims priority, application European Pat. Off., Aug. 17, 1988, 8811346.6
Int. Cl.[5] G01J *3/18, 3/42*
U.S. Cl. 356—328 **8 Claims**



1. Spectrometer for determining the spectral composition of a polychromatic beam of radiation, comprising:
an array of photosensitive elements (1, 2, . . . , n) with each element intercepting a different wavelength range of the polychromatic beam of radiation,
a plurality of transfer switches (SW1, . . . , SWn), each switch being connected to a photosensitive element, having a control input terminal for controlling the opening and closing of the switch, and having an output terminal, and
read-out circuitry connected to the transfer switches for opening or closing the transfer switches and for generating during a read-out cycle signals indicative of the amount of radiation intercepted by the photosensitive elements,
characterized in that the read-out circuitry comprises a switch control circuit (41,43,44,45,46) which is designed for controlling the transfer switches (SW1, . . . , SWn) in

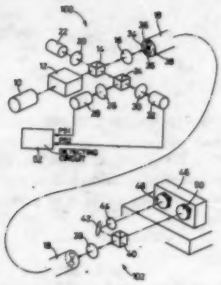
selectable groups (SW1–SW24; SW25–SW48; . . .) of switches such that during a read-out cycle only selected groups of photosensitive elements (1–24; 25–48; . . . n) are read out, with such selected groups comprising less than the whole array of photosensitive elements.

4,958,929

OPTICAL FIBER SENSOR

Michio Kondo, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

Filed Feb. 6, 1989, Ser. No. 306,165
Claims priority, application Japan, Feb. 10, 1988, 63-29313
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—345 **8 Claims**



1. An optical fiber sensor comprising:

optical fiber means for transmitting a first and a second linearly polarized laser beam in a first and a second transmission mode which have mutually perpendicular polarization planes, such that said polarization planes are maintained;

a light transmitter/receiver portion for producing said first and second linearly polarized beams such that said beams have different frequencies, and directing said first and second linearly polarized beams to said optical fiber means so that the beams are transmitted in said respective two transmission modes in a first direction from a proximal end of the optical fiber means to a distal end thereof, said light transmitter/receiver portion receiving and detecting a reference and a measuring beam which have been returned through said optical fiber means in a second direction from said distal end toward said proximal end;

a sensor head portion operable to receive said first and second linearly polarized beams transmitted through said optical fiber means in said first direction, and split the received beams into said reference and measuring beams, such that each of said reference and measuring beams consists of two components having mutually perpendicular polarization planes corresponding to those of said first and second linearly polarized beams, said sensor head portion causing a transmission parameter of at least said measuring beam to be influenced by a change of an external subject, combining the reference and measuring beams, and returning the combined beams to said light transmitter/receiver portion through said optical fiber means in said second direction; and

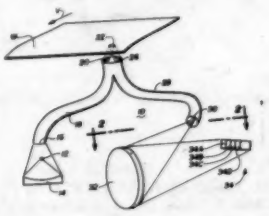
said sensor head portion including means for rotating by 90 degrees the polarization planes of said two components of one of said reference and measuring beams, in opposite directions, before said reference and measuring beams are combined and are incident upon said distal end of said optical fiber means in said second direction, for transmission through said optical fiber means in said second direction.

4,958,930

APPARATUS FOR MONITORING THICKNESS VARIATIONS IN A FILM WEB

Charles W. Robertson, Jr., Centerville, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 11, 1985, Ser. No. 807,517
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—357 **7 Claims**



1. An inspection apparatus for monitoring, on-line, variations in thickness of a traveling web comprising:

a polychromatic radiation source;

means for directing radiation from the source onto a predetermined portion of the web as the same moves with respect to the source to generate an interference fringe pattern by the interferometric action of the surfaces of the web; and

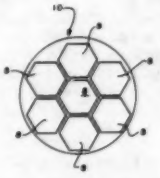
means for monitoring a predetermined one of fringes in the pattern and for generating an electrical signal the amplitude and polarity of which are functionally related to the magnitude and direction, respectively, of the displacement of the fringe thereby to provide an indication as to corresponding variations in web thickness.

4,958,931

SYSTEM UTILIZING AN ACHROMATIC NULL LENS FOR CORRECTING ABERRATIONS IN A SPHERICAL WAVEFRONT

Berge Tatian, Middlesex, Mass., assignor to Litton Systems, Inc., Lexington, Mass.

Filed Apr. 14, 1989, Ser. No. 338,826
Int. Cl.[5] G01B 9/02
U.S. Cl. 356—360 **18 Claims**



1. A wavefront correction system for correcting the spherical aberrations in a polychromatic wavefront of light caused by reflecting the wavefront off a concave aspherical reflecting surface, the system comprising:

a light source for generating an original wavefront of polychromatic light;

an achromatic null lens to which the wavefront is directed, the null lens comprising a zero power lens combination and a concave mirror arranged such that the light entering the null lens passes through the zero power lens combination, reflects off the mirror, and is refocussed back through the zero power lens combination to exit the null lens;

a concave aspherical reflecting surface in the path of the light exiting the null lens such that the light reflects off the concave aspherical reflecting surface, and retraces the path, passing a second time through the null lens, the light being once again refocussed by the null lens and;

means for reflecting light from said null lens toward said concave aspherical reflecting surface and for directing at least a portion of the light exiting from said null lens after being reflected from said concave aspherical reflecting surface toward an interferometer.

4,958,932

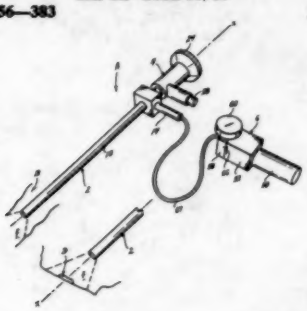
OPTICAL MEASURING APPARATUS

Jerry T. Kegelman; Joseph C. Kroutil, and Rodney Lusk, all of St. Louis County, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Aug. 18, 1988, Ser. No. 234,169

Int. Cl.[5] G01B *11/00*

U.S. Cl. 356—383 **22 Claims**



1. A measuring apparatus for measuring the distance between two locations on a surface without actually contracting the surface at those locations, said measuring apparatus comprising: a scope through which one may look to observe the surface, that scope having a distal end which is presented toward the surface to be observed and a proximal end that is located remote from the surface, the scope further having an optical axis and providing a field of view which lies beyond its distal end, the scope displaying reference marks within the field of view; a source of light; optical measuring means for projecting light derived from the source of light into the field of view to at least two regions spaced around the optical axis, for within each region presenting the light at localized areas spaced differently from the optical axis, for changing the localized areas at which the light is presented in each region, and for correlating the localized areas with units of linear measure, so that when the light at two localized areas is reflected from the surface within the field of view and the localized areas align with the reference marks, the distance between the two localized areas from which the light is reflected is known.

4,958,933

COOLER-EXTRUDER DEVICE

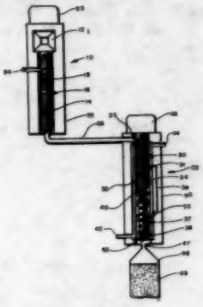
Paul Zakich, 721 Cliffside Dr., Akron, Ohio 44313

Filed Nov. 25, 1988, Ser. No. 275,923

Int. Cl.[5] B29B *1/06*

U.S. Cl. 366—81 **13 Claims**

1. A cooler-extruder employing a compound feed screw which includes a flights' section adjacent to a wiper section, and which is positioned in a first barrel to propel plastic material in said first barrel through said flights' section, and then through said wiper section, wherein said flights' section comprises a helical spiral ridge which forms an integral part of, and around a rotatable shaft, and said wiper section comprises a plurality of wiper blade assemblies tangentially mounted on pairs of spaced apart, raised circular ridges on said shaft, adjacent wiper assemblies being mounted radially displaced relative to each other, and wherein said first barrel is provided with means for cooling the material being propelled therethrough, said cooler-extruder being in communication with a primary foam extruder wherein a blowing agent is introduced



into melted plastic being propelled by a feed screw through a second barrel of said primary extruder, after which the plastic material is introduced into said cooler-extruder.

4,958,934

METHOD AND APPARATUS FOR CONTINUOUS MELTING OF GELLED SUBSTANCE

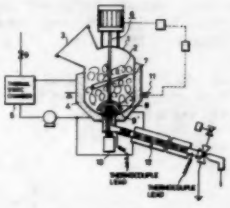
Hirokazu Saito; Seiichi Yukawa; Takashi Sato; Kiyoyuki Ushirokozi; Nobutoshi Aoyagi; Tomio Suzuki, and Minoru Tanaka, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 4, 1987, Ser. No. 45,992

Claims priority, application Japan, May 2, 1986, 61-100998

Int. Cl.[5] B01F *15/06*

U.S. Cl. 366—145 **7 Claims**



1. A continuous method for melting a gelled substance, comprising the steps of:

charging a gelled substance into a tank;

heating walls of said tank;

agitating a central portion of said gelled substance charged into said tank, thereby imparting motion to an entire portion of said charged gelled substance;

continuously separating a melt from the charged gelled substance by the combination of separately agitating a portion of said charged gelled substance located in an area around a melt discharge port and a separation screen, and simultaneously filtering said melt from said gelled substance using said screen;

discharging said melt through said discharge port;

measuring a flow of said melt out of said tank; and

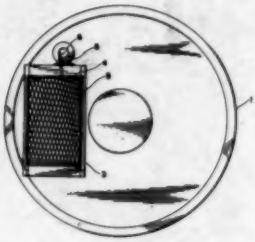
in response to said measuring step, controlling the rate of agitation of said gelled substance in said two agitating steps.

4,958,935

METHOD OF BREAKING UP BUNDLES OF ADHERENT HARD FIBERS AND AN OSCILLATING SCREEN

Bygg S. Axelsson, Box 3100, S-780 64 Lima, Sweden

Filed Sep. 29, 1988, Ser. No. 250,925
Int. Cl.[5] B01F *11/00*
U.S. Cl. 366—154 20 Claims



7. A method of breaking up bundles of adherent hard fibers, particularly steel fibers for defibering them to produce defibered or individualized fibers, and feeding said defibered or individualized fibers to a mixing device, the method comprising:

vibrating said bundles of adhering fibers on an oscillating screen to obtain separated fibers;

passing said separated fibers being aligned in a plane parallel to the plane of said screen through oblong openings of said screen, through which openings in the main only one fiber at a time can pass; and

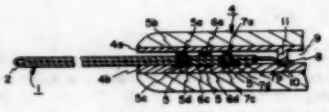
supplying by means of gravity and oscillating force said individual fibers to said mixing device spread over a large area, said area being larger than the areas of said screen.

4,958,936

ELECTRIC THERMOMETER

Tamaki Sakamoto, Otokuni; Toshiyuki Kobayashi, Kyoto; Norihito Yamamoto, Shiga, and Tamio Miyake, Otokuni, all of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan

Continuation of Ser. No. 744,422, Jun. 13, 1985, abandoned. This application Jan. 27, 1987, Ser. No. 8,078
Claims priority, application Japan, Jun. 13, 1984, 59-121032
Int. Cl.[5] G01K *15/00*
U.S. Cl. 374—1 8 Claims



1. An electronic thermometer, comprising:

(a) temperature sensing means incorporating a temperature sensor element;

(b) temperature measuring and processing means including a measuring unit for determining temperature on the basis of a signal output from said temperature sensing means and a display unit for displaying the temperature determined by said measuring unit;

(c) code means in the form of a plurality of perforations for recording information of a temperature characteristic of said temperature sensor element in said temperature sensing means;

(d) reading means including resilient contacting means for reading said information of the temperature characteristic from said code means wherein at least some of said resilient contacting means pass through said perforations;

(e) means for correcting the temperature determined by said measuring and processing means in accordance with the information of the temperature characteristic read out from said code means; and

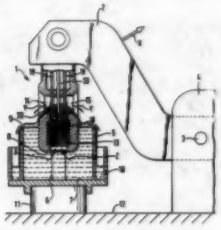
(f) means for switching on and off said reading means when said temperature sensing means is physically combined with said measuring and processing means.

4,958,937

METHOD AND DEVICE FOR DETERMINING THE BOILING TEMPERATURE

Peter Lohberg, Friedrichsdorf; Arno May; Hans J. Krause, both of Goettingen; Dietmar Oberdorfer, and Ulrich Plueguett, both of Goettingen, all of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt Am Main, Fed. Rep. of Germany

Filed Jul. 14, 1988, Ser. No. 234,670
Int. Cl.[5] G01N *25/08*
U.S. Cl. 374—16 10 Claims



1. A device for determining the boiling temperature of a test liquid comprising a probe and measuring means, said probe including a measuring unit with a temperature sensor, the probe being immersible in said test liquid to a predetermined depth, means for supporting said probe to maintain said predetermined depth of said probe in said liquid, said probe including a supply opening through which liquid enters the measuring unit and forms a liquid level directly beneath the temperature sensor, means in thermal contact with said test liquid for heating said test liquid to a boiling temperature to cause ebullition of said test liquid in a boiling zone on top of said liquid level, in which the boiling temperature is detected by said temperature sensor a condensation zone in the measuring unit in which condensate forms above the boiling zone, said condensation zone being connected with the atmosphere by way of discharge openings for the condensate, wherein the heating means is inserted into the supply opening and wherein the probe is arranged on a tiltable arm extending through which are electric junction wires for the temperature sensor and for the heating means.

4,958,938

TEMPERATURE TRANSMITTER WITH INTEGRAL SECONDARY SEAL

Bradley N. Schwartz, Lakeville; Stanley Kugler, Golden Valley, and Donald W. Selg, Mendota Heights, all of Minn., assignors to Rosemount Inc., Eden Prairie, Minn.

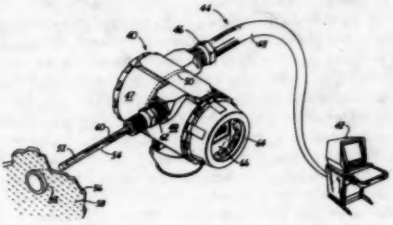
Filed Jun. 5, 1989, Ser. No. 361,239
Int. Cl.[5] G01K *1/08, 1/10*
U.S. Cl. 374—208 9 Claims

1. A temperature transmitter connectable to a first conduit subject to fluid contamination which contains a lead from a temperature sensor and also connectable to a second conduit which conveys an output lead to a location remote from the transmitter, comprising:

wall means disposed in the transmitter for sealingly dividing

the transmitter into first and second compartments, the first compartment opening to the first conduit for receiving the lead from the temperature sensor, and the second compartment opening to the second conduit for receiving the output lead;

converter means, disposed in the first compartment and having converter terminals receiving the lead from the



temperature sensor, and an electric converter circuit for providing an output representing temperature; and

feedthrough means sealingly passing through the wall means and having conductors electrically insulated from the wall for conducting the output to the output lead such that the transmitter blocks flow of the fluid contamination to the second conduit and to the remote location.

4,958,939

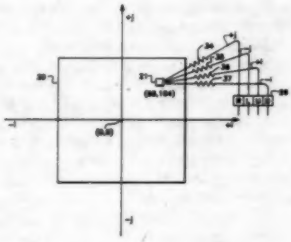
CENTERING SCHEME FOR PATTERN RECOGNITION

Tariq Samad, Minneapolis, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 14, 1988, Ser. No. 270,183

Int. Cl.[5] G06K *9/00*

U.S. Cl. 382—35 **4 Claims**



1. A camera assembly, comprising, a movable camera unit of the type used for image acquisition which has (1) adjusting means for the up, down, left and right movements of a field of view window thereof relative to an image and (2) a two dimensional window projection on the focal plane thereof comprising an array of photo-sensitive transducer elements which convert sensed optical values to voltages for representing acquired image data in the form of pixels, said array of transducer elements being logically arranged in the form of a two-dimensional matrix with an "i" and "j" axes cartesian coordinates format, said transducer elements having output voltages i_i, j, neural type weight means for each of said transducer elements having respective weight values corresponding to the "i" and "j" coordinate values related thereto, camera movement shift means comprising right, left, up and down shift units with all of said shift units being connected via said weight means to each of said transducer elements, said shift units being connected respectively to said camera unit adjusting means and having output shift signals derived from said output voltages and said "i" and "j" coordinate values for iteratively moving said camera unit in directions relative to said pattern to effect at least substantial centering of said pattern relative to said field of view window, said weight values being positive values corresponding to the absolute values of said coordinate values.

4,958,940

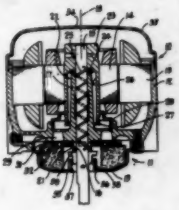
ELECTRIC MOTOR LUBRICATION

Wayne J. Morrill, 3448 S. Washington Rd., Ft. Wayne, Ind. 46804 (Judith A. Morrill, Conservator)

Continuation-in-part of Ser. No. 220,982, Jul. 15, 1988, which is a continuation of Ser. No. 945,813, Dec. 24, 1986, abandoned. This application Mar. 8, 1989, Ser. No. 320,767

Int. Cl.[5] F16C *17/02*

U.S. Cl. 384—398 **14 Claims**



1. A lubrication system for a bearing of an electric motor comprising, in combination:

a stator;

a bearing fixed relative to said stator and having a shaft aperture;

an oil reservoir for said bearing:

a rotor having a shaft journaled in said bearing shaft aperture and coaxially disposed to cooperate with said stator;

an oil access hole in said bearing for access of oil from said oil reservoir to the circumferential surface of said shaft:

a generally helical oil groove in the external surface of said shaft extending from said oil access hole longitudinally into said bearing;

first and second edges on said oil access hole:

said first edge being a first counterclockwise plow edge on the downstream edge relative to a counterclockwise rotational direction of said shaft;

said second edge being a first clockwise plow edge on the downstream edge relative to a clockwise rotational direction of said shaft and

each said plow edge being disposed at an angle relative to the shaft axis to have a component of force directing oil longitudinally into said bearing for said counterclockwise and clockwise rotational directions, respectively.

4,958,941

SUPPORT UNIT

Yoshifumi Imanari, Shibukawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 23, 1990, Ser. No. 484,111

Claims priority, application Japan, Mar. 6, 1989, 1-25318[U]

Int. Cl.[5] F16C *33/58*

U.S. Cl. 384—474 **4 Claims**

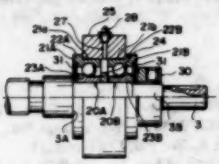
1. A support unit comprising:

a housing having an aperture formed therein for receiving a fixing bolt;

an angular ball bearing having an outer race and an inner race assembled in said housing, the inner race of said bearing being held by a step portion of a supported shaft to receive a load in a direction of thrust;

a flange formed on an outer peripheral surface of the outer

race of said bearing, said flange being adapted to abut against one end face of said housing to fix the outer race in position; and



a nut engaging said supported shaft for clamping the inner race of said bearing to fix the inner race in position.

4,958,942

OIL SEAL ASSEMBLY

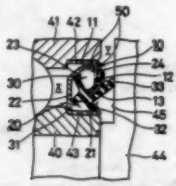
Shiro Shimizu, Osaka, Japan, assignor to Koyo Seiko Co., Ltd., Osaka, Japan

Filed Sep. 20, 1989, Ser. No. 409,696

Claims priority, application Japan, Sep. 26, 1988, 63-125530[U]

Int. Cl.[5] F16C *33/78*

U.S. Cl. 384—486 **12 Claims**



1. An oil seal assembly comprising inner and outer annular members rotatable relative to each other and disposed generally concentrically with each other with a certain distance therebetween, and an elastic annular sealing member bonded to said outer annular member and in sliding contact with said inner annular member to seal annular cavities between said inner and outer annular members,

said oil seal assembly further comprising:

said outer annular member having a cylindrical portion and an annular flange portion extending from one end of said cylindrical portion radially inwardly,

said inner annular member having an inner cylindrical portion, an annular flange portion extending from an inner end of said inner cylindrical portion, the inner cylindrical portion being opposed to said cylindrical portion of said outer annular member, and said inner annular member having an outer cylindrical portion extending from an outer peripheral surface of said inner annular flange portion in an axial direction and having a certain distance from an inner peripheral surface of said cylindrical portion of said outer annular member in the radial direction,

said elastic annular sealing member having a plurality of seal lips bonded to the inner peripheral portion of said annular flange portion of said outer annular member, a first one of said seal lips being in slidable contact with at least an outer peripheral surface of said inner cylindrical portion of said inner annular member, a second one of said seal lips being in slidable contact with an inner peripheral surface of said annular flange portion of said inner annular member, and a third one of said seal lips extending in a direction generally perpendicular to the first seal lip and generally parallel to the second seal lip, said third seal lip further generally being positioned on an opposite side of the outer annular member than the second lip, and

a narrow space being formed between an end face of said outer cylindrical portion of said inner annular member and the inner peripheral surface of said flange portion of said outer annular member.

7. A rolling bearing assembly comprising:

an inner ring;

an outer ring disposed concentrically with said inner ring so that an annular cavity is formed therebetween said outer ring being readily separable from said inner ring;

a plurality of rolling elements disposed within said annular cavity for rotation of said rings relative to each other;

means for sealing said annular cavity, said sealing means includes an outer annular member fixed into the end portion of an inner peripheral surface of said outer ring, an inner annular member fixed onto the end portion of an outer peripheral surface of said inner ring, and an elastic annular sealing member bonded to said outer annular member and in slidable contact with at least said inner annular member to seal annular cavities between said inner and outer annular members;

said outer annular member having a cylindrical portion fitted to a stepped portion formed on the end portion of said inner peripheral surface of said outer ring, and an annular flange portion extending from an outer end of said cylindrical portion radially inwardly,

said inner annular member having an inner cylindrical portion fitted to a stepped portion formed on the end portion of the outer peripheral surface of said inner ring, an annular flange portion extending from an inner end of said inner cylindrical portion radially outwardly, and an outer cylindrical portion extending from an outer peripheral portion of said annular flange portion extending in an axial direction and being concentric with said inner cylindrical portion and having a certain distance from an inner peripheral surface of said cylindrical portion of said outer annular member in the radial direction,

said elastic annular sealing member having a plurality of seal lips bonded to the inner peripheral portion of said annular flange portion of said outer annular member, a first one of said seal lips being in slidable contact with at least an outer peripheral surface of said cylindrical portion of said inner annular member, and a second one of said seal lips being in slidable contact with an inner peripheral surface of said annular flange of said inner annular member and a third one of said seal lips being in slidable contact with an end face of a member attached to the inner ring and wherein the second and third seal lips extend in directions which are generally perpendicular to a direction in which said first seal lip extends and said third seal lip is generally positioned on an opposite side of the outer annular member than the second lip, and

a narrow space being formed between an end face of said outer cylindrical portion of said inner annular member and the inner peripheral surface of said cylindrical portion of said outer annular member.

4,958,943

BALL BEARING

Tsutomu Nakanishi, Kunitachi, Japan, assignor to C.S.U. Ltd, Tokyo, Japan

Continuation of Ser. No. 920,692, Oct. 17, 1986, abandoned. This application Jan. 5, 1989, Ser. No. 293,934

Claims priority, application Japan, Oct. 25, 1985, 60-165494; Dec. 16, 1985, 60-194142; Mar. 14, 1986, 61-37145; Jun. 25, 1986, 61-98070

Int. Cl.[5] F16C *33/60*

U.S. Cl. 384—488 **13 Claims**

1. A ball bearing for a floppy disc comprising:

a shaft having an outer periphery with a groove of part circular cross-section,

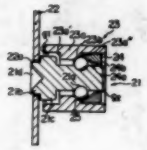
a plurality of balls partly received in said groove,

a ring-shaped outer race, and

a bearing race,

said outer race and said bearing race being separate from said shaft and surrounding the outer periphery of said shaft in spaced relation, said outer race and bearing race respectively having inner peripheral surfaces forming ball rolling surfaces in contact with said balls to bear against the balls engaged within said groove,

said shaft including a cylindrical portion of larger diameter surrounded by said outer race to form a gap between said portion of larger diameter and said outer race to protect the balls from entry of dust;



said bearing race having an outer peripheral surface inserted into and secured to the inner peripheral surface of said outer race for rotatably supporting said balls against the ball rolling surface of the outer race and against the groove in the shaft; and

said outer race having first and second end portions of larger diameter and a central portion of smaller diameter so that a central step is formed in the outer race, said central step having one corner formed with a tapered surface to constitute said ball rolling surface of the outer race.

4,958,944

BEARING FOR WHEEL MOUNT

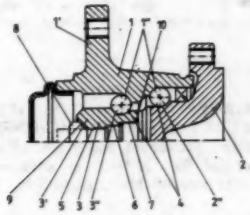
Heinrich Hofmann, Schweinfurt, and Manfred Trister, Bad Kissingen, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Dec. 21, 1989, Ser. No. 454,073

Claims priority, application Fed. Rep. of Germany, Jan. 25, 1989, 3902141

Int. Cl.[5] F16C *33/58*

U.S. Cl. 384—512 **11 Claims**



1. A wheel mount comprising

an outer ring for defining the outer races of two rows of bearing rolling elements;

an axially more inward axle journal having an exterior periphery which defines a first inner race for one of the rows of rolling elements and cooperating with a respective first one of the outer races defined inside the outer ring;

axially outward of the first inner race, a separate inner ring having an external periphery with a second inner race defined thereon for cooperating with a respective second one of the outer races on the interior of the outer ring for the second row of rolling elements;

The separate inner ring having an axially inner end which is axially pressed against the axle journal; the separate inner ring having an internal bore, and the axle journal including a pin which is generally complementary in shape to the internal bore of the inner ring and projects through the internal bore;

the separate inner ring having a radially widened region at the axially more outward region thereof, and the internal bore of the separate ring having the smallest diameter at the widened region; axially inward of the widened region, the internal bore having defined in it a plurality of steps of gradually greater diameter from step to step axially inward, and the axle journal having cooperating, correspondingly shaped steps defined on it shaped for force fitting the inner ring on the correspondingly shaped axle journal.

4,958,945

SPINDLE UNIT

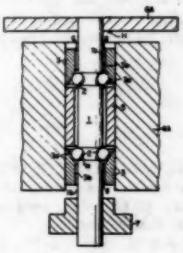
Tsutomu Nakanishi, Kunitachi, Japan, assignor to C.S.U. Ltd., Tokyo, Japan

Continuation of Ser. No. 920,700, Oct. 17, 1986, abandoned. This application Apr. 6, 1989, Ser. No. 344,674

Claims priority, application Japan, Oct. 25, 1985, 60-162972; Nov. 27, 1985, 60-183385; Dec. 6, 1985, 60-188660; Apr. 15, 1986, 61-57328; May 21, 1986, 61-77195

Int. Cl.[5] F16C *19/08*

U.S. Cl. 384—512 **19 Claims**



1. A spindle unit comprising a cylindrical shaft having an outer peripheral surface with an annular groove provided therein, said groove having a part circular cross section, a plurality of spherical balls partly received in said groove and partly projecting therefrom, said balls being rotatable in said groove, an annular race adjacent to said groove and having a tapered surface bearing against the balls partly projecting from the adjacent groove to hold the balls within the groove,

means by which said race applies the tapered surface thereof against said balls with pressure to retain the balls in said groove,

a bearing housing in which said race is supported, said bearing housing having a cylindrical outer surface,

said shaft having opposite ends projecting from said housing, and

rotor means fixed on each of the ends of the shaft projecting from the housing for rotation with said shaft, the rotor means on one of said ends comprising a pulley.

4,958,946

SEPARATION FOR BALL BEARINGS

Horst Voll, Hassfurt, Fed. Rep. of Germany, assignor to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany

Filed Jan. 17, 1990, Ser. No. 466,471

Claims priority, application Fed. Rep. of Germany, Jan. 18, 1989, 3901250

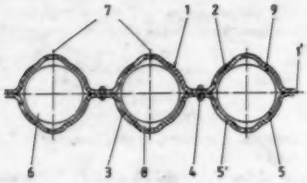
Int. Cl.[5] F16C *33/42*

U.S. Cl. 384—523 **9 Claims**

1. A separator for a row of ball bearings, wherein the separator has a plurality of pockets defined in it, and each pocket is for receiving a respective ball of the ball bearing; the separator

having a length dimension, each pocket extending into the separator across the length dimension;

each pocket being shaped for defining a deeper recess in the pocket in the vicinity of a pole of the respective bearing ball which is supported in and rotates in the pocket, and the recess being so shaped and of such depth that the interior surface of the separator at the pocket recess is spaced a greater distance from the bearing ball in the



pocket than the interior surface is spaced from the bearing ball away from the pole of the ball;

in the remaining region of the interior surface of the separator at the pocket, the interior surface being shaped so as to be spaced from the bearing ball and to define a generally wedge-shaped slot, and the interior surface being close enough to the bearing ball that in the wedge-shaped slot, a hydrodynamic lubricating film can build up.

4,958,947

AXIAL ROLLING BEARING

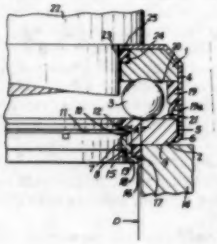
Heinz Peter, Dittelbrunn, and Rainer Schurger, Schwanfeld, both of Fed. Rep. of Germany, assignors to SKF GmbH, Schweinfurt, Fed. Rep. of Germany

Filed Jul. 31, 1989, Ser. No. 387,709

Claims priority, application Fed. Rep. of Germany, Aug. 3, 1988, 8809903

Int. Cl.[5] F16C *19/10*

U.S. Cl. 384—609 **7 Claims**



1. An axial rolling bearing comprising:

a housing ring having an outer face and a fastening rim portion located axially beyond the outer face of the housing ring;

a sleeve fitted into the housing ring and cooperating with said fastening rim, said sleeve having an axial portion that includes a radial rim;

a flexible ring, said radial rim having a maximum diameter that is smaller than the maximum diameter of said flexible ring when said flexible ring is mounted on said sleeve;

a housing for said rolling bearing; and

said flexible ring providing a predetermined radial tension between the axial portion of the sleeve and the housing.

4,958,948

SYSTEM FOR DRIVING A BRUSHLESS MOTOR

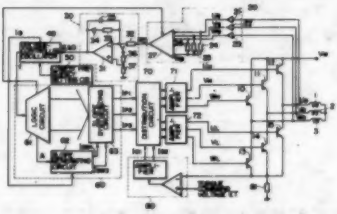
Toshiaki Seima, Yonago; Susumu Yamamoto, Takatsuki, and Hiromitsu Nakano, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 3, 1989, Ser. No. 416,538

Claims priority, application Japan, Oct. 7, 1988, 63-254066

Int. Cl.[5] H02D *5/16*

U.S. Cl. 388—812 **2 Claims**



1. A system for driving a brushless motor comprising:

motor drive coils belonging to a plurality of phases respectively;

a plurality of pairs of drive transistors connected to said drive coils respectively;

a distribution circuit for sequentially distributing drive-coil energization switching signals to said plural drive transistors respectively;

a slope synthesizer for smoothing leading and trailing slope portions of said drive-coil energization switching signals so as to apply the smoothed energization switching signals to said drive transistors respectively through said distribution circuit;

a voltage-controlled oscillator for supplying a signal having a suitable frequency as an input to said slope synthesizer;

a phase error detector for detecting the phase difference between counter-electromotive voltages induced in said drive coils and said drive-coil energization switching signals in a drive-coil energization pause period; and

an error amplifier for amplifying the output signal of said phase error detector and applying the amplified phase error signal as an input to said voltage-controlled oscillator.

4,958,949

DRIVE ELEMENT FOR PLATENS OF TYPEWRITERS OR SIMILAR OFFICE MACHINES

Johannes Haftmann, Schwabach, and Rudolf Schmeykal, Hemhofen, both of Fed. Rep. of Germany, assignors to TA Triumph-Adler Aktiengesellschaft, Nurenberg, Fed. Rep. of Germany

Filed Apr. 27, 1989, Ser. No. 343,698

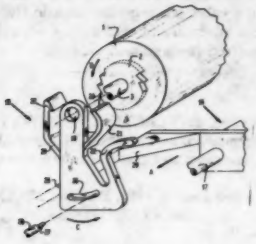
Claims priority, application Fed. Rep. of Germany, May 4, 1988, 3815066

Int. Cl.[5] B41J *19/80*

U.S. Cl. 400—314 **8 Claims**

1. A drive device for the platen of an office imprinting machine having a movable type-carrier carriage, the platen having a line-space wheel fast therewith, the device comprising a drive element pivotally mounted on the shaft of the platen, the drive element having a resilient arm engageable with a fixed abutment acting in use to urge the drive element into a normal position of rest, the drive element also having at least one ratchet co-operable with the said ratchet, the drive element having transport element engageable by a part of the carriage so that at the end of carriage movement in one direction the said carriage part engages the said element and displaces the drive element angularly against the action of the resilient arm, which returns the drive element to its rest posi-

tion upon return movement of the carriage, the said ratchet effecting rotation of the platen and wheel through one line-



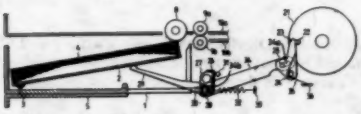
space in the course of movement of the drive element away from and back to its position of rest.

4,958,950

PAPER FEEDER FOR PRINTER

Yousuke Kobayashi, and Keiichi Fukazawa, both of Hiroshima, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Filed Mar. 30, 1989, Ser. No. 330,690
Claims priority, application Japan, Apr. 21, 1988, 63-100491
Int. Cl.[5] B41J *13/03*
U.S. Cl. 400—629 **5 Claims**



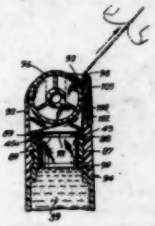
1. A paper feeder for a printer comprising:
a tray having a stage on which papers to be fed are stacked, the stage being movable between predetermined first and second positions;
a platen rotatable in a first direction and in a reverse direction;
a motor connected to rotate said platen by producing motive power;
means for transmitting the motive power of said motor to position said stage at the predetermined first position for paper feeding operation when said platen rotates in the reverse direction; and
a paper feeding means having a feeding roller for feeding an uppermost one of said papers during the feeding operation, the predetermined first position of said stage bringing the uppermost paper into contact with said feeding roller;
wherein said transmitting means comprises:
a first pin connected to said platen;
a first fulcrum;
a lever rotatably supported at said first fulcrum and urged by said first pin, the lever having a second pin mounted thereon;
a second fulcrum;
an angle member having first and second ends rotatably supported at the first end by said second fulcrum;
a shaft connected to the second end of said angle member;
a link having first and second ends engaged at the first end thereof with said lever by said second pin and at the second end thereof with said angle member;
a paper feeding lever rotatable about said shaft in accordance with the rotation of said platen in the reverse direction to urge said stage to the predetermined first position; and
a first torsion spring engaged at one end thereof with said paper feeding lever and at the other end thereof with said angle member to urge said paper feeding lever.

4,958,951

HOT WAX HAIR REMOVER APPARATUS

Samuel J. Mann, Englewood, N.J., assignor to Inverness Corporation, Fairlawn, N.J.

Continuation of Ser. No. 716,289, Mar. 26, 1985, Pat. No. 4,773,784, which is a continuation-in-part of Ser. No. 344,135, Jan. 29, 1982, abandoned. This application Jul. 26, 1988, Ser. No. 225,105
The portion of the term of this patent subsequent to Sep. 27, 2006, has been disclaimed.
Int. Cl.[5] A45D *40/00, 40/26, 34/04*
U.S. Cl. 401—1 **6 Claims**



1. A wax applicator for use with a heating sleeve for dispensing a depilatory wax for removal of hair from skin comprising a reservoir means for holding said depilatory wax, said reservoir means including a neck having an opening therein through which said depilatory wax can flow, said reservoir means defining a container configured to be disposed into a heating sleeve, said depilatory wax being normally disposed in a substantially solid state when at room temperature and being disposed into a flowable state by the force of gravity when the dispenser is disposed in a heating sleeve and is heated above a predetermined temperature of 112.2° F., a human's threshold temperature of thermally evoked pain, a dispenser head, said dispenser head including a roller seated within a plurality of surrounding housing walls forming a housing, so that a surface of said roller in facing relationship with a first housing wall which has a predetermined clearance therebetween for limiting the thickness of the flowable hot wax that is dispensed by gravity so that the thickness of the waxed dispensed thereby does not exceed 0.8mm, said housing further supporting a strut means, said strut means defining an opening so that said strut means is securable to said neck of said reservoir means to permit gravity to cause said wax to flow through said opening in said neck and said opening in said strut means into contact with said roller when said wax is heated so that a layer of heated wax not exceeding 0.8mm is dispensed by said roller wherein a second housing wall in facing relationship with said roller is spaced at a distance greater than 0.8mm to permit wax remaining on said roller to be carried by said roller and remetered on the next revolution of said roller.

4,958,952

CABLE SECURING DEVICE

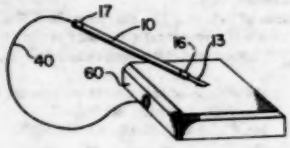
Lance G. Willett, 12407 Kathrya St., Maple Ridge, British Columbia, Canada (V2X 8X8)

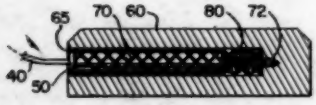
Filed Sep. 27, 1989, Ser. No. 413,126
Int. Cl.[5] B41J *1/54, 3/36*; B41B *27/26*; A47F *7/00*
U.S. Cl. 401—131 **10 Claims**

6. A pen and pen base set, comprising:
(a) a pen and means connecting same to one end of a securing cable;

(b) an elongated cylindrical plug and means connecting same to an opposed end of said cable;

(c) a wire mesh grip secured within a cylindrical hole extending into said base, said grip being sized within said hole for longitudinally receiving and grippingly engaging said plug; and,





(d) a release key having an elongated tubular wall sized for sliding longitudinally over said plug within said hole while pushing said wire mesh grip backwardly over said plug for releasing the grip of said wire mesh grip on said plug.

4,958,953

EXPANDABLE CONNECTOR TO AXIALLY JOIN TUBULAR DEVICES

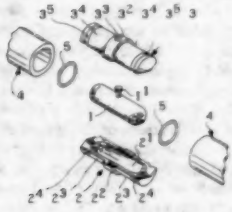
Georges Charondiere, 1 rue Jules Ferry, Bonson 42160 Andrezieux Boutheon, France

Filed Apr. 19, 1989, Ser. No. 340,465

Claims priority, application France, Apr. 27, 1988, 88 05944

Int. Cl.[5] F16B 7/00

U.S. Cl. 403—297 **2 Claims**



1. A connector for fixedly securing end portions of at least two tubular means and being positionable within bores of each of said end portion of each said tubular means comprising an elongated first half shell and an elongated second half shell and being dimensioned to fit internally of said end portions of said two tubular means, each of said half shells having an elongated axially disposed recessed wall, said first half shell and said second half shell when in connector use being in confronting relationship whereby the recessed wall of said first half shell and the recessed wall of said second half shell define a void, an inflatable casing positioned in said void and being dimensioned to exert substantially uniform pressure against each of said recessed walls of each of said half shells thereby radially forceably thrusting apart each half shell internally of said end portions of said at least two tubular means to frictionally engage the said connector to the internal end portions of said two tubular means and thereby effectuating connection of said tubular means, said half shells together having a substantially centrally located radially extending flange dimensioned larger than said bores of each said end portion of each of said tubular means, said flange of at least one said half shell having a transverse bore to communicate internally of said void and said casing having a valve passing through said transverse bore to provide access internally of said casing whereby said casing may be pressurized through said valve.

4,958,954

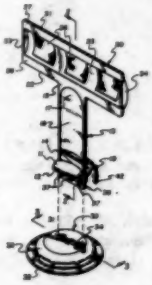
HORIZONTAL REFLECTIVE HIGHWAY MARKER

Donald W. Schmanski, and Michael M. Leigh, both of Carson City, Nev., assignors to Carsonite International, Carson City, Nev.

Filed Dec. 5, 1988, Ser. No. 279,675

Int. Cl.[5] E01F 9/00

U.S. Cl. 404—10 **5 Claims**



1. A delineator device having high visibility and utility for attachment to a paving surface, said device comprising a non-tubular, insertable delineator body of one piece construction including:

(a) a base member including a plate with upper and lower faces, said base member including a projecting tab section vertically coupled to the lower face of the base at one end and extending downward therefrom;

(b) a vertical support member having a top end and a bottom end and an intermediate section including an elongated concavo-convex structure configured to face toward on-coming traffic when mounted at the paving surface, said bottom end being integrally formed with the upper face of the base in vertical orientation;

(c) a horizontal member integrally formed with the top end of the vertical support member and having a top edge and a bottom edge, opposing distal sides and an interior section intermediate between the top and bottom edges and between the opposing distal sides and which includes an elongated concavo-convex structure configured to face toward on-coming traffic when mounted at the paving surface;

(d) a receiving base member adapted for direct attachment at the paving surface and having a top face and a substantially flat bottom face and an intermediate support body having a length sufficient to vertically support the length of the tab section and attached delineator device and including a slotted portion configured to receive the tab section therein with a snug fit;

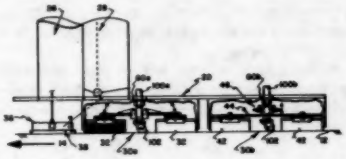
(e) means for locking the tab section within the slotted portion to retain the device in position at the paving surface, said locking means comprising at least one horizontal slide-lock member projecting from the tab section of each side thereof, said support body including a horizontal slide-track channel formed in size and configuration to first receive the slide-lock members in a vertical insert position and to provide a second locking position which is lateral of the insert position top form a slide path and provide a tight fit for the slide-lock members.

4,958,955

METHODS AND APPARATUS FOR DISPENSING, MIXING AND APPLYING COATING CONSTITUENTS TO TRAFFIC SURFACES USING TANDEM OPERATED SETS OF ROTARY TOOLS

Alexander Laditka, 4741 Dalebridge #C-10, Warrensville Hts., Ohio 44128

Continuation of Ser. No. 213,449, Jun. 28, 1988, abandoned, which is a continuation of Ser. No. 85,253, Aug. 11, 1987, abandoned, which is a continuation of Ser. No. 892,337, Aug. 1, 1986, abandoned, which is a continuation-in-part of Ser. No. 532,742, Sep. 16, 1986, Pat. No. 4,603,999, which is a continuation-in-part of Ser. No. 408,484, Aug. 16, 1982, Pat. No. 4,477,203. This application Jun. 19, 1989, Ser. No. 368,084
The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.
Int. Cl.[5] E01C 7/06
U.S. Cl. 404—75 33 Claims



1. A method of applying to a traffic surface a coating composition consisting of plural ingredients, wherein the method comprises the steps of:

(a) depositing a plurality of ingredients from a plurality of individual supply sources upon a traffic surface to be coated, with the deposits of at least selected ones of the ingredients being made in relatively close proximity to each other to facilitate the formation of a deposit mixture;

(b) bringing into contact with the deposited ingredients a plurality of rotary stirring tools, with each of the rotary stirring tools including an associated rotary structure having associated depending blades that are arranged in an array about an associated axis that extends substantially normal to the traffic surface, with the axes of the rotary stirring tool begin spaced horizontally from one another to position the rotary stirring tools in relatively close proximity to each other for rotation in tandem to cooperatively effect mixing and application of the deposited ingredients to form a coating on the traffic surface, and with at least selected ones of the rotary stirring tools each having means connecting its associated blades to its associated rotary structure so that, when the associated rotary structure and blades are rotated about the associated axis, the blades are permitted to move a limited amount relatively toward and away from the rotary structure, and to rock relative to the rotary structure about other axes that extend substantialiy parallel to the traffice surface;

(c) rotating the plurality of rotary stirring tools about their assocaited axes with the blades of the selected ones of the rotary stirring being urged into substantially continuous contact with the traffic surface and with the deposited ingredients to effect a a rapid mixing of the ingredients to a condition of uniform consistence; and

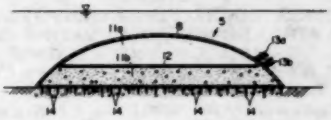
(d) smoothing the mixed ingredients to the traffic surface by continuing rotation of the plurality of rotary stirring tools about said axes, with the blades of the selected ones of the rotary stirring tools moving relative to their movements to the contour of the traffice surface and to substantially maintain contact with the traffic surface.

4,958,956

SUBMERGED FLEXIBLE WAVE RESTRAINING STRUCTURE AND A METHOD OF CONSTRUCTING IT

Masahiro Tanaka; Takumi Ohyama; Akihiko Hirayama; Tetsushi Kiyokawa; Seiji Ichii; Yutaka Katsura; Tadashi Ono, and Katsunori Shimizu, all of Tokyo, Japan, assignors to Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Sep. 23, 1987, Ser. No. 99,958
Int. Cl.[5] E02B 3/04
U.S. Cl. 405—23 7 Claims



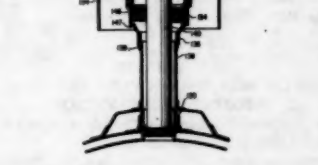
1. A wave reducing structure for reducing waves on a liquid surface from propagating over a certain border, comprising at least one energy absorbing means, constructed submergedly on a bottom of the liquid beneath the border, for absorbing the energy of waves, the energy absorbing means having at least one resilient body which is deformable when a pressure distribution around it changes as the waves pass over the resilient body, each said at least one resilient body comprising at least one substantially hermetic pliant bag which is expanded by a fluid contained therein, said fluid being comprised of the surrounding ambient liquid, said pliant bag being provided with at least one diaphragm separating an inner area of the pliant bag into closed chambers, a height of the resilient body being between 0.2 to 0.8 times the depth of the liquid surrounding the at least one resilient body.

4,958,957

SYSTEM FOR UNDERGROUND STORAGE AND DELIVERY OF LIQUID PRODUCT, AND RECOVERY OF LEAKAGE

Robin Berg, Hudson, Wis., Lawrence Mohns, Media, Pa., and Richard Oswald, Elverson, Pa.
assignors to Sun Refining & Marketing Company, Philadelphia, Pa.

Filed Mar. 1, 1989, Ser. No. 317,565
Int. Cl.[5] B65G 5/00
U.S. Cl. 405—55 12 Claims



11. A system for the underground storage of liquid products and delivery of said product to an above-ground dispensing means, comprising: an underground storage tank provided with at least first and second fittings, to remove a means for filling said storage tank and means for pumping product from said storage tank to said dispensing means, respectively, both said fittings being entirely contained within trapezoidal secondary containment chamber mounted on and sealed to said storage tank, said containment chamber comprising a plurality of drain holes at its lowest points, as installed, fill means comprising an adapter in sealed communication with said first

fitting, said adapter bearing an outer containment pipe which, together with said containment chamber completely encloses a riser for attachment to a means for delivering a product to said riser, said riser being in fluid communication with said storage tank,

means for pumping product from said storage tank to said above-ground dispensing means, said means for pumping being in fluid communication with said above-ground dispensing means.

4,958,958

SUBTERRANEAN HEAT INSULATED PIPE SYSTEM WITH A BENDING, AND A METHOD OF ESTABLISHING SUCH A SYSTEM

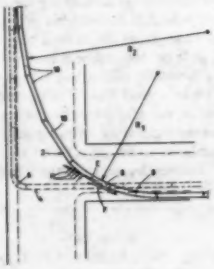
Hans N. Pedersen, Horsens, Denmark, assignor to I. C. Moller A/S, Fredericia, Denmark

Continuation of Ser. No. 115,412, Nov. 2, 1987, abandoned, which is a continuation-in-part of Ser. No. 661,946, May 18, 1984, abandoned. This application Apr. 21, 1989, Ser. No. 341,747

Claims priority, application Denmark, May 20, 1983, 2251/83

Int. Cl.[5] F16L *1/02*

U.S. Cl. 405—154 **22 Claims**



1. A subterranean heat insulated pipe system for conveying a fluid having a temperature deviating from an ambient temperature surrounding the heat insulated pipe system, the heat insulated pipe system being surrounded by a stiff insulation foam, the pipe system comprising at least two straight pipe lengths, at least one angle bending pipe length means for interconnecting the straight pipe lengths so as to form a first bending run beneath, for example, a street crossing, characterized in that the angle bending pipe length means has a radius of curvature substantially just sufficiently small enough to condition the bending to be fully self stabilized solely in and by engagement with the earth without any additional anchoring means against expansion and contraction forces resulting from internal temperature changes in the pipe system.

4,958,959

METHOD OF RELINING SEWERS AND WATER LINES WITHOUT EXCAVATION

Henri S. St. Onge, Scarborough, Canada, assignor to Duratron Systems Limited, Scarborough, Canada

Continuation of Ser. No. 892,875, Jan. 13, 1986, Pat. No. 4,796,669, which is a continuation of Ser. No. 284,442, Jul. 17, 1981, abandoned. This application Jan. 9, 1989, Ser. No. 294,754

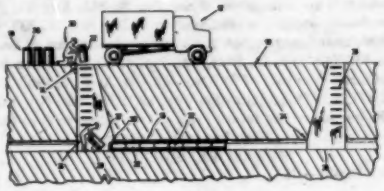
The portion of the term of this patent subsequent to Jan. 10, 2006, has been disclaimed.

Int. Cl.[5] F16L *1/036*

U.S. Cl. 405—184 **6 Claims**

1. A method of relining a buried pipeline with interconnectable plastic pipe sections of an appropriate diameter for insertion within the buried pipeline, each section having a male connection at one end and a female connection at the other end with said female connection and male connection being sized to cooperate with an opposite connection and form a locked fit between said connections such that said connections cannot be inadvertently axially withdrawn one from the other, said method comprising bringing short pipe sections to an open end of the buried pipeline,

aligning an individual pipe section with the buried pipeline such that the pipe section is on grade with the buried pipeline,



effecting a connection between any pipe section previously immediately inserted in said pipeline to form the locked fit between the sections,

forcing said connected pipe sections into the buried pipeline by either pulling or pushing said sections in preparation for the insertion of the next pipe section into the buried pipeline.

4,958,960

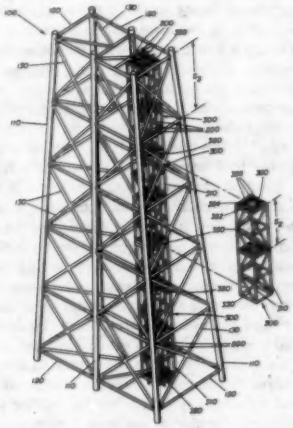
WELL CONDUCTOR SUPPORT STRUCTURE AND METHOD FOR USING

James W. Turner, and M. Sidney Glasscock, both of Houston, Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed May 22, 1989, Ser. No. 354,943

Int. Cl.[5] E02B *17/00*

U.S. Cl. 405—195 **16 Claims**



1. A conductor support module for supporting well conductors of an offshore platform, said conductor support module being separate from but integrable with the jacket of said offshore platform, said conductor support module comprising:

a plurality of substantially parallel vertical support members; and

a plurality of horizontal conductor support members attached to said vertical support members, the vertical spacing between adjacent horizontal conductor support members being determined by the lateral support requirements of said well conductors;

whereby lateral loads on said well conductors are transferred from said well conductors to said conductor support module and thereby to said offshore platform.

4,958,961

ANCHORING ARRANGEMENT FOR A ROD-SHAPED TENSION MEMBER FORMED OF FIBER REINFORCED COMPOSITE MATERIAL

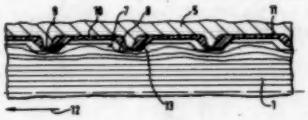
Thomas Herbst, Wessling, and Dieter Jungwirth, Bad Heilbrunn, both of Fed. Rep. of Germany, assignors to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Oct. 10, 1989, Ser. No. 419,151

Claims priority, application Fed. Rep. of Germany, Oct. 8, 1988, 3834266

Int. Cl.[5] E02B *1/00*; E04C *3/10*

U.S. Cl. 405—260 **9 Claims**



1. Anchoring arrangement for anchoring a rod-shaped tension member formed of a fiber reinforced composite material for use as an anchor element in foundation and mining construction or as a reinforcing member for concrete and prestressed construction, said tension member has an outside surface with a helical thread formed thereon, an anchoring member having an inside surface with a helical thread formed therein arranged to interfit with the thread on said tension member and disposed in radially spaced relation thereto, and an intermediate layer located between and in engagement with the thread on said tension member and the thread on said anchoring member, and said intermediate layer is formed of a material affording large deformations relative to said tension member and anchoring member at slight increases in stress when overloads act on the tension member.

4,958,962

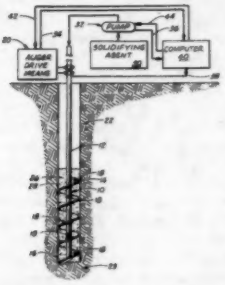
METHODS OF MODIFYING THE STRUCTURAL INTEGRITY OF SUBTERRANEAN EARTH SITUS

Verne L. Schellhorn, Gualala, Calif., assignor to Halliburton Company, Duncan, Okla.

Filed Jun. 28, 1989, Ser. No. 373,351

Int. Cl.[5] E02D *3/12*

U.S. Cl. 405—267 **13 Claims**



1. A method of strengthening and improving the load bearing capacity of material in a subterranean earth situs comprising:

advancing a soil processing tool into said situs to break said material into pieces; and

while advancing said soil processing tool into said situs, introducing a solidifying agent into said pieces from said tool at a velocity in the range of from about 300 ft./sec. to about 2500 ft./sec. to hydraulically divide said pieces into very fine particles and admix said solidifying agent with said particles whereby a uniform admixture of said solidifying agent and said material is achieved; and allowing said admixture of said solidifying agent and said material to harden.

4,958,963

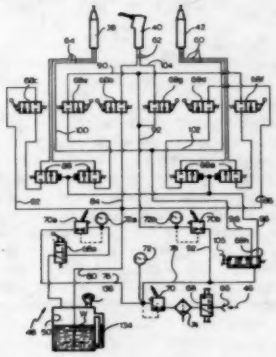
MOBILE WORK STATION FOR PODIATRIST

Ronald Perrault, 3, avenue des Sapins, Notre-Dame des Prairies, Province de Québec, J6E 1C3, Canada

Filed Nov. 24, 1989, Ser. No. 440,748

Int. Cl.[5] A61C *1/02*

U.S. Cl. 408—56 **1 Claim**



1. A work station for podiatrist comprising:

(a) a large, rigid frame;

(b) compressed air feed means, having an outlet integral to said frame;

(c) a water-containing tank, integral to said frame;

(d) at least a first and second turbine drill members, to be connected to the compressed air feed means outlet and water tank, and movable away from the frame;

(e) at least one spray gun, to be connected also to the compressed air feed means and water tank, movable away from the frame;

(f) a pneumatic tubing network, operatively connecting said drill members and spray gun to said compressed air feed means outlet and water tank, said network defining a main line means, feeding water from said water tank to each drill member and spray gun through a corresponding one of a first series of water lines, and also feeding pressurized air from said compressed air feed means outlet to each drill member and spray gun through a corresponding one of a second series of air lines; wherein operation of each drill member and spray gun is controlled by the flow of water and/or air therethrough;

(g) a number of pneumatically operating, manually controlled, non electromagnetic valve members, including at least one for each said water line and at least one for each said air line;

(h) a foot-pedal actuated, pneumatically operating, non-electromagnetic valve member, operatively connected through connecting means to each said drill member, for controlling operation thereof; wherein said work station works solely by pneumatic forces, with positively no electrical current of any kind being present therewithin,

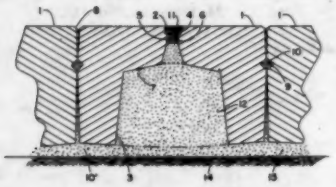
whereby there is no danger whatsoever of electrocution through use of water therein; and wherein the flow of air and water through each said drill members and spray gun is monitored independently of each other by said valve members, at continuous, variable rates.

4,958,964

SEMIRIGID FLOATING PAVEMENT

Javier B. Soto, and Domingo F. Llamas, both of Calle Ramón Gordillo Nr. 5, 46010 Valencia, Spain

Filed Aug. 12, 1988, Ser. No. 231,876
Claims priority, application Spain, Aug. 13, 1987, 8702395
Int. Cl.[5] E01C *5/00*
U.S. Cl. 404—40 **6 Claims**



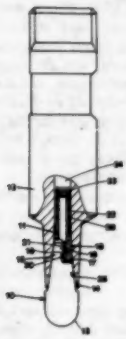
1. A semirigid floating pavement comprising at least two independent pieces in the form of paving blocks laterally placed back to back to form a surface of variable width, characterized in that each one of the pieces is formed by molded blocks of a resistant material, each of said pieces having a flat upper surface, a base and an inner recess which opens at said base and is connected with the upper surface through an orifice; said base being formed by one or more planes inclined toward a geometric axis of the piece, the back to back pieces having adjacent outer lateral walls which are inclined relative to each other so as to allow a certain movement between the pieces, wherein each one of the outer lateral walls is provided with a channel, said channel housing an elastic joint of union and support between the pieces.

4,958,965

TOOL FOR METAL CUTTING

Bengt N. G. Strand, and Sven L. Eklund, both of Fagersta, Sweden, assignors to Seco Tools AB, Fagersta, Sweden

Division of Ser. No. 204,284, Jun. 9, 1988, Pat. No. 4,850,759.
This application Jun. 15, 1989, Ser. No. 365,903
Claims priority, application Sweden, Jul. 8, 1987, 87027990
Int. Cl.[5] B23B *51/00, 31/10*
U.S. Cl. 408—226 **7 Claims**



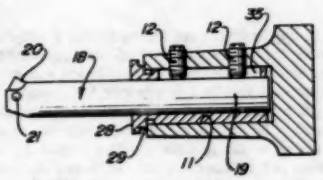
1. A cutter adapted to be rotated about a front-to-rear extending longitudinal axis and comprising a front portion having a cutting edge and a rear portion for mounting said cutter, said rear portion having a conical outer periphery, the shortest radius of which is defined by a rearmost end of said rear portion, said rear portion including a hook-shaped projection formed by a laterally open recess in said outer periphery, said recess including a generally rearwardly facing first surface extending laterally inwardly from said outer periphery, a generally laterally outwardly facing second surface extending rearwardly from a laterally inner end of said first surface, a third surface facing generally toward said first surface and extending generally laterally outwardly from a rear end of said second surface, a laterally outer end of said third surface disposed laterally inwardly of an imaginary extension of said outer periphery.

4,958,966

TOOL HOLDER BUSHING

Edward A. Andrews, 379 Executive Dr., Troy, Mich. 48083

Division of Ser. No. 292,228, Dec. 30, 1988, Pat. No. 4,896,892.
This application Dec. 4, 1989, Ser. No. 445,995
Int. Cl.[5] B23B *31/04*
U.S. Cl. 408—239 A **6 Claims**



1. A tool holder bushing for mounting an elongated tool shank coaxially within an elongated socket bore formed within a tool holder, machining turret and the like elements of a machine tool, comprising:

an elongated, cylindrically shaped tube whose length is considerably greater than its diameter, having an outer end and inner end, an exterior diameter and an interior diameter;

means for enabling retention of the bushing tube within the socket, said retention means axially positioned about said tube;

rim means adapted for engaging a surface defining an opening of the socket, said rim means formed with said outer end of said tube, and channel means formed annularly about said tube adjacent said rim means; and

one of the exterior and interior diameters being dimensioned in accordance with the inch measuring system and the other being dimensioned in accordance with the metric system, wherein a socket and a tool which are of differing dimensional measuring systems may be optionally used together to mount the tool upon a machine tool.

4,958,967

SPINDLE FEED MECHANISM FOR A MACHINE TOOL

Sakashi Adachi, Numazu, Japan, assignor to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 12, 1989, Ser. No. 406,613
Claims priority, application Japan, Sep. 22, 1988, 63-237922
Int. Cl.[5] B23C *1/06*; B23B *39/00*
U.S. Cl. 409—185 **4 Claims**

1. A spindlehead for a machine tool comprising:

(a) a casing defining a linear guideway;

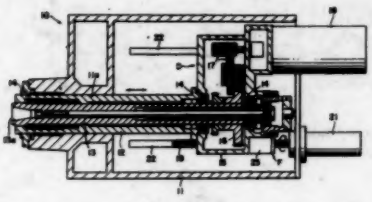
(b) a spindle sleeve mounted to the casing for reciprocating movement out of and into the casing along the linear guideway;

(c) a spindle rotatably mounted within the spindle sleeve and

restrained from axial displacement relative to the same for joint axial movement with the spindle sleeve out of and into the casing;

(d) fixed guide means mounted to the casing;

(e) spindle drive means coupled to the spindle for imparting rotation thereto, the spindle drive means jointly reciprocating with the spindle and the spindle sleeve relative to the casing and having at least a portion slidably engaged with the guide means for linear displacement along the guideway; and



(f) feed means mounted to the casing for linearly reciprocating the spindle and the spindle sleeve and the spindle drive means relative to the casing.

4,958,968

ADAPTER FOR MACHINE-TOOL SPINDLE

Rainer von Haas, Geesthacht, and Willi Jester, Herten, both of Fed. Rep. of Germany, assignors to Krupp Widia GmbH, Essen, Fed. Rep. of Germany

Filed Oct. 23, 1989, Ser. No. 425,711

Claims priority, application Fed. Rep. of Germany, Oct. 21, 1988, 3835879

Int. Cl.[5] B23C *1/04*

U.S. Cl. 409—232 **15 Claims**

1. In combination with:

a machine spindle

rotatable about an axis

formed with an axially centered forwardly flared large-diameter seat,

provided in the seat with at least two axially and radially displaceable spindle jaws,

having an axially displaceable actuating rod axially coupled with the jaws, and

formed with cam formations engageable with the jaws to move same together on axial rearward displacement; and

a tool

normally also centered on the axis, and

formed with an axially centered rearwardly tapered small-diameter stem substantially smaller than the seat; an adapter comprising:

an adapter body normally centered on the axis and formed with

a forwardly open small-diameter adapter seat complementary with the tool stem,

a rearwardly projecting adapter stem snugly receivable in the large-diameter seat of the spindle,

a flange flatly engageable with the front end of the spindle when the adapter stem is in the spindle seat, and

at least one rearwardly projecting tongue having a radially deflectable rear end engageable between a respective one of the jaws and the spindle when the adapter stem is in the spindle seat to press the one jaw radially inward;

a connector rod axially limitedly displaceable in the adapter body between a front position and a rear position and having a rear end formed as a head engageable by the jaws;

at least one locking member engageable between the rod and the tool stem to lock the tool in the adapter seat when the connector rod is in the rear position.

4,958,969

ADAPTER SLEEVE

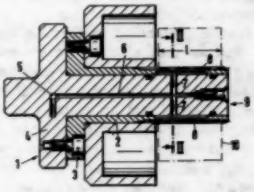
Rudolf Och, Nuremberg, Fed. Rep. of Germany, assignor to Firma Fresco Verzahnungslehren GmbH, Altdorf, Fed. Rep. of Germany

Filed Sep. 29, 1989, Ser. No. 414,758

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 8812608[U]

Int. Cl.[5] B23C *5/26*; B23B *31/40*

U.S. Cl. 409—234 **12 Claims**



6. A compressible adapter sleeve made of one of titanium and an unhardened titanium alloy, for an hydraulic lathe chuck which is operated by fluid pressure, said sleeve having an outer side with spaces arranged so as to conduct the fluid which is or will be under pressure, and having an inner side formed so as to push inwards against an object to be clamped, the inner side of the adapter sleeve comprising a hard layer.

4,958,970

GRADUATED-LOAD SPRING WASHER SYSTEM FOR SCREWS AND THREADED FASTENERS

James D. Rose, and William H. Suder, III, both of Canoga Park, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 17, 1988, Ser. No. 233,291

Int. Cl.[5] F16B *31/02*

U.S. Cl. 411—12 **8 Claims**

1. A graduated-load spring washer system for screws and threaded fasteners to maintain a tailored preload and screw-locking force on a sandwiched joint to prevent loosening before, during and after joint thickness changes caused by material stress relaxation, creep and wear, comprising:

a. A threaded fastener means and a graduated-load spring washer;

b. said threaded fastener means, having a head, being opera-

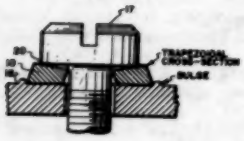
ble to apply compressive load forces to said graduated-load spring washer and said sandwiched joint when tightened;

c. said graduated-load spring washer comprising a deflection coil spring of slightly less than one coil;

d. said coil spring having an upper surface that is in contact with the outer circumference of the head of said fastener means throughout the tightening process whereby the contact between the head and said upper surface of the coil spring is spaced inwardly from the outer circumference of the coil spring;

e. said coil spring having a lower surface that provides a gap between the lower surface of said coil spring and the surface of said sandwiched joint, said lower surface pressed flat against said surface of said sandwiched joint when said graduated-load spring washer is fully compressed;

f. said coil spring having an outer peripheral surface and an inner peripheral surface, said outer peripheral surface determining the greater thickness of said graduated-load spring washer;



g. the opposite ends of said slightly less than one coil spring having a specially contoured configuration which prevents marring and minimizes damage of external surfaces of the sandwiched joint;

wherein a precise preloading of force is applied by said threaded fastener means to said graduated-load spring washer at a position directly below said outer circumference of said head of said threaded fastener means and onto said upper surface of said graduated-load spring washer when said threaded fastener is tightened to flatten said graduated-load spring washer coil against the sandwiched joint, thereby maintaining a large anti-unscrewing force, spring force and centering force applied in opposition to forces that cause joint separation, thus keeping the sandwiched joint compressively loaded although large joint-thickness changes occur; and without degrading fatigue capability of the fastener means or causing structural configuration changes that make the fastener means susceptible to overload failure.

4,958,971

BREAK-STEM BLIND RIVET

Raymond D. Lacey, Essendon, and William D. Bradley, Welwyn Garden City, both of England, assignors to Avdel Limited, Hertfordshire, England

Continuation of Ser. No. 147,907, Jan. 25, 1988, abandoned. This application Sep. 14, 1989, Ser. No. 407,707

Claims priority, application United Kingdom, Jan. 30, 1987, 8702155

Int. Cl.[5] F16B *13/04*

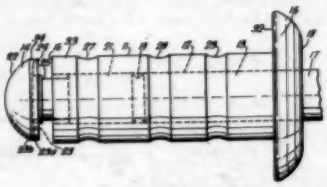
U.S. Cl. 411—38 **10 Claims**

1. A blind break-stem rivet comprising a deformable tubular shell having a bore inside it, and a stem extending along the bore and having a head adjacent one end of the shell;

the shell being formed with a plurality of circumferential zones of modified strength spaced apart along the shell;

in which the spacing between each zone and the next progressively decreases as the distance along the shell from the said one end thereof increases,

wherein each of said zones of modified strength is a single rolled groove having a width to depth ratio greater than 5,



whereby said rivet has a large grip range and good clamp-up.

4,958,972

BREAKABLE COMPOSITE DRILL SCREW

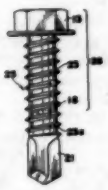
Katsumi Shinjo, Osaka, Japan, assignor to Yugen Kaisha Shinjoseisakusho, Osaka, Japan

Filed Nov. 1, 1989, Ser. No. 430,845

Claims priority, application Japan, Nov. 25, 1988, 63-297334

Int. Cl.[5] F16B *25/00, 31/00*

U.S. Cl. 411—387 **2 Claims**



1. A breakable composite screw comprising: a first shank made of an austenitic stainless steel; a driving head extending from one end of the first shank and engageable with a screw driving tool; a flat surface formed at the other end of the first shank in a direction perpendicular to an axis of the first shank; a second shank made of a low-carbon steel and being of the same diameter D as the first shank; a welding lug protruding centrally from an end of the second shank; the second shank being fixedly adjoined to the flat surface by projection-welding by means of the welding lug to thereby provide a break zone at the other end of the first shank; a drill bit formed by cold forging at an end of the second shank; a continuous thread which is formed by thread-rolling so as to extend around both outer cylindrical peripheries of the first shank and second shank wherein a portion extending from the break zone to the drill bit is hardened or quenched.

4,958,973

INTERNAL-PRESSURE-BEARING FEMALE SCREW

Nobuyuki Sugimura, 308, Mabase, Shimizu-shi, Shizuoka-ken, Japan

Filed Jun. 9, 1988, Ser. No. 204,196

Claims priority, application Japan, Mar. 23, 1988, 63-68669

Int. Cl.[5] F16B *35/04*; F16L *25/00*

U.S. Cl. 411—423 **5 Claims**

1. An internal-pressure-bearing female screw formed on the inside of an opening of a vessel main body where an internal pressure varies and formed to be mated with a male screw to form a screw connection adapted to be applied with a varying composite load due to variation of an internal pressure, said male and female screws having threads, said threads having valleys and heights, characterized in that the thread contact heights of said female screw are formed so as to be successively lowered along the direction of the center of the vessel main

body, the distance from female thread valley bottom to female thread valley bottom being substantially constant, and a line

connecting said female thread valley bottoms being substantially parallel with a line connecting male thread valley bottoms.

4,958,974

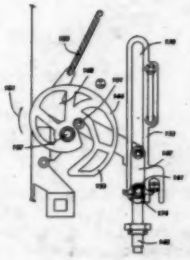
DAMPED BINDING APPARATUS

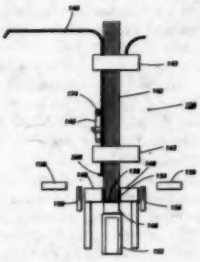
Richard C. Schenk, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Aug. 7, 1989, Ser. No. 389,932

Int. Cl.[5] B42C *9/00*

U.S. Cl. 412—37 **18 Claims**





1. An apparatus for binding a set of sheets by applying a strip having an adhesive on one surface thereof to one edge of the set, including:

means for supporting and heating the strip to soften the adhesive thereon;

means for moving said supporting means and the set of sheets relative to one another so as to press one edge of the set of sheets into the adhesive on the strip;

means for controlling the depth of penetration of said one edge of the set of sheets into the adhesive on the strip so as to form a layer of adhesive between said one edge of the set and the strip having a predetermined thickness; and

means for damping said moving means to absorb a substantial portion of the kinetic energy of the set of sheets as the set of sheets contacts the adhesive on the strip reducing deflection and distortion of the set of sheets.

4,958,975

CART WHEEL CONTROL FOR HOISTWAY CAR

Angelo M. Vaccaro, Charlotte, N.C., and Robin C. Morse, Elizabethtown, N.Y., assignors to The Peelle Company, Bay Shore, N.Y.

Division of Ser. No. 909,036, Sep. 18, 1986, Pat. No. 4,787,802, which is a continuation-in-part of Ser. No. 803,103, Nov. 27, 1985, abandoned. This application Sep. 20, 1988, Ser. No. 246,788

Int. Cl.[5] B65G *1/04*

U.S. Cl. 414—259 **6 Claims**

1. An automatic cart lift system for moving wheeled carts between levels, comprising a car vertically movable in a hoistway, the car having a platform indexable with the levels, an automatic transfer device on the platform, said transfer device having a horizontal slot adjacent the plane of the platform, a wheeled cart supported by a multiplicity of wheels including a swiveled set adjacent one end and movable on and off the platform, said cart having a bottom wall and guide means depending below the bottom wall, said guide means being arranged to pass horizontally into the slot of the transfer device, the guide means with reference to the direction of cart travel on and off the platform having a first portion adjacent the center of the cart and a second portion adjacent an end of the cart such that said first and second portions are spaced from each other a distance in the order of one-half the length of the cart whereby the cart is laterally guided on and off the platform by interengagement between the guide means and the slot at points spaced a relatively large distance in the direction of travel so that a tendency of the cart to yaw on said swivel wheels is resisted.

4,958,976

DEVICE FOR THE STORAGE, INSERTION, AND REMOVAL OF CONTAINERS

Ernst Haueter, Bowil, Switzerland, assignor to Ascom Autelca AG., Gümligen, Switzerland

Filed Feb. 17, 1989, Ser. No. 311,733

Claims priority, application Switzerland, Mar. 14, 1988, 961/88

Int. Cl.[5] E05G *1/08*

U.S. Cl. 414—331 **16 Claims**

1. Device for the storage, insertion, and removal of containers in and, respectively, from a secured space (6), comprising

safe including a safe housing (1) surrounding the safe interior secured space (6), and a safe door (20);

said safe housing (1) having a first opening lockable by said safe door (20) and at least one second opening (10);

at least one rack (14, 15) having a plurality of storage sites (16) therein arranged in tiers in superimposed relationship;

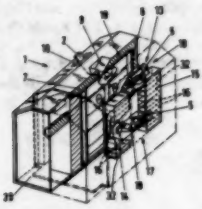
a plurality of containers (5) inserted in said storage sites (16) of said rack (14, 15), said rack (14, 15) having a wall (32),

each of said containers (5) positioned adjacent to said wall (32);

said first opening lockable by said safe door (20) being so vast that said at least one rack (14, 15) can be inserted in and, respectively, removed from said interior secured space of said safe housing (1) through said first opening;

said at least one second opening (10) being smaller than said first opening and dimensioned for the individual issuance and introduction of said containers (5) or container contents, respectively;

conveying means (18, 13) connected in said interior secured space (6) in said safe housing (1) for individually conveying said containers (5) from said storage sites (16) of said rack (14, 15) to said second opening (10) and back again;



means (17, 19) adapted for carrying said at least one rack (14, 15) to an operation place in said safe housing (1) in proximity to said conveying means (18, 13) and, respectively, away therefrom; and

locking means on said at least one rack operative to lock said plurality of containers in said at least one rack upon removal of said at least one rack from said operation place in said safe housing, and to unlock said plurality of containers from said at least one rack upon positioning said at least one rack on said operation place.

4,958,977

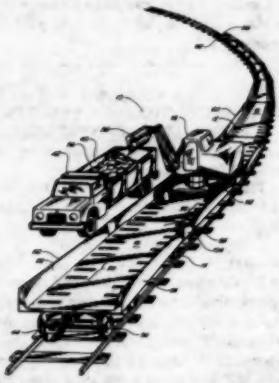
SYSTEM FOR THE TRANSPORT OF BULK COMMODITIES

Edwin deS. Snead, P.O. Box 1000, Georgetown, Tex. 78627

Filed Jan. 27, 1989, Ser. No. 302,380

Int. Cl.[5] B65G 67/02

U.S. Cl. 414—339 **12 Claims**



1. A material transport system comprising:

a material container means for receiving material to be transported, said material container means having a generally flat floor extending between a pair of side walls, said material container means comprising a plurality of railroad cars, said flat floor extending through said plurality of railroad cars, each of said railroad cars being articulated to an adjacent car;

motive means connected to said material container means for allowing said material container means to move from one place to another; and

unloader means positioned within said material container means for unloading material from said material container means, said unloader means comprising:

tractor means extending between said side walls of said material container means, said tractor means for selectively moving said unloader means longitudinally along said floor; and

a shovel articulated to said tractor means, said shovel having a size for fitting between said side walls, said shovel for passing material from between said side walls to a location external of said material container means, said floor of said material container means being in frictional relationship with said tractor means of said unloader, said floor having a plurality of slots formed transversely therein for engaging a portion of said tractor means.

4,958,978

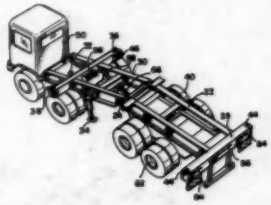
ARTICULATED DUMPING VEHICLE

Joseph Shedleski, Levittown, Pa., assignor to George E. Wilkinson, Bensalem, Pa.

Filed Sep. 12, 1988, Ser. No. 243,475

Int. Cl.[5] B60P 1/14

U.S. Cl. 414—483 **10 Claims**



1. A vehicle for transporting a removable container, comprising:

a trailer chassis carried on at least one ground engaging means supporting the chassis above a ground surface and spacing an upper surface of the chassis above said ground surface, said upper surface of the chassis being contoured to complement a lower surface of the container when the container is placed on the chassis, the chassis having a rigid fore section and a rigid aft section, the fore section being connectable to a tractor by a king pin defining a substantially vertical articulation axis between the tractor and the vehicle, the fore and aft sections being normally aligned co-linearly with both said fore section and said aft section directly bearing the container thereon, said fore and aft sections being articulated to one another at a knuckle defining a horizontal articulation axis between said fore and aft sections, the knuckle being free to pivot only in a direction causing the fore and aft sections to become inclined downwardly from the knuckle;

means for at least temporarily fixing the container to the aft section of the chassis; and,

articulation drive means attached to the fore section and to the aft section at points spaced from the articulation axis of the knuckle, the articulation drive means being controllably operable to force the fore and aft sections to pivot around the knuckle, thereby lifting the knuckle relative to the fore and aft sections and tilting the container aft, said articulation drive means including a winch with a reel

mounted to one of the fore section and the aft section and a line wound on the reel, the line being fixed to the other of said fore section and said aft section, the winch shortening the line between the fore section and the aft section to tilt the container.

4,958,979

ARRANGEMENT FOR A LIFT ADAPTED TO A MOTOR VEHICLE

Ingemar Svensson, Bentzel's 22, 44300 Lerum, Sweden

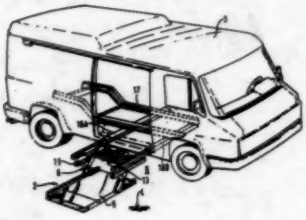
PCT No. PCT/SE87/00523, § 371 Date Apr. 19, 1989, § 102(e) Date Apr. 19, 1989, PCT Pub. No. WO88/03484, PCT Pub. Date May 19, 1988

PCT Filed Nov. 9, 1987, Ser. No. 346,834

Claims priority, application Sweden, Nov. 10, 1986, 8604797-4

Int. Cl.[5] B60P *1/44*

U.S. Cl. 414—549 **7 Claims**



1. Vehicle lift arrangement, comprising: a lifting platform, a scissor mechanism, a power source located beneath said platform when said platform is in a raised position and located above said platform when said platform is in a lowered position, said lifting platform attached by said scissor mechanism to said power source, a frame for supporting said lifting platform, said frame being movable between a withdrawn storage position close to the vehicle and an extended lifting position away from the vehicle, a support link having a first and a second end, said support link forming part of said scissor mechanism and being movably engaged with said lifting platform and with said frame, and a guide link having a first and a second end, said guide link being in movable engagement with said platform and said frame.

4,958,980

QUICK CONNECT/DISCONNECT WHEEL CRADLE ARRANGEMENT FOR WHEEL LIFT TOWING SYSTEMS

Gerald E. Holmes, Chattanooga, Tenn., and Fleming V. Cannon, Jr., Flintstone, Ga., assignors to Century Wrecker Corporation, Ooltewah, Tenn.

Division of Ser. No. 152,517, Feb. 5, 1988, abandoned. This application Nov. 7, 1988, Ser. No. 268,562

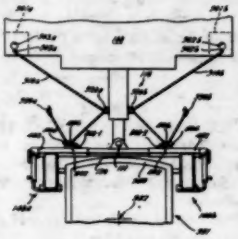
Int. Cl.[5] B60P *3/12*

U.S. Cl. 414—563 **12 Claims**

1. In a wheel lift towing system including a towing vehicle having a front end and a rear end and having a tow bar pivotally coupled to a cross arm for carrying wheel engaging cradles at opposite end portions thereof, said tow bar extending rearwardly from said towing vehicle in a direction substantially horizontally and substantially along the longitudinal axis of said towing vehicle, an arrangement for coupling a back-up safety line, such as a safety chain, between the towing vehicle and a towed vehicle situated in said wheel engaging cradles, the arrangement comprising:

a first storage compartment in the rear end of said towing vehicle having a keyhole shaped aperture therein for lengthwise receiving and latching of an unused portion of a first safety line;

first guide means positioned on said tow bar and having an aperture through which the first safety line is routed; and



first latching means positioned on said cross arm for receipt of the first safety line at a predetermined position along its length after a free end of the first safety line has been coupled to the towed vehicle.

4,958,981

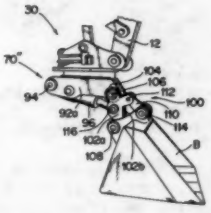
ATTACHMENT CONNECTOR ASSEMBLY FOR HYDRAULIC SHOVEL TYPE EXCAVATOR

Masatoshi Uchihashi, 223, Oaza Michibe, Mikazuki-machi, Ogi-gun, Saga-ken, Japan

Filed Dec. 20, 1988, Ser. No. 286,711

Int. Cl.[5] E02F *3/36*

U.S. Cl. 414—694 **3 Claims**



1. An attachment connector assembly for use with a hydraulic shovel type excavator including a stick arm or dipper stick wherein the attachment consists of a bucket with a suspension structure comprising a pair of bracket means having first and second sets of aligned, spaced apart holes formed therein, said connector assembly comprising:

connector head means connected to the excavator stick arm or dipper stick for controlled pivotal movement about a first axis;

rotating means mounted to the connector head means for rotation relative thereto about a second axis under the control of drive means operatively associated with the rotating means, the second axis extending substantially transverse to the first axis; and

a mounting structure comprising a fitting plate member removably secured to the rotating means, a pair of parallel hollow boss means disposed in spaced apart relationship relative to each other and secured to the fitting plate, and a pair of leg means pivotally connected at respective one ends thereof through pivot pin means to one of the boss means at opposite sides thereof and having a hollow tubular member integrally joined to respective other ends of the leg means;

said bucket adapted to be attached to the mounting structure by means of a first mounting pin extending through the hollow tubular member of the mounting structure and the first set of the aligned holes of the bucket suspension

structure and a second mounting pin extending through the other boss means of the mounting structure and the second set of the aligned holes of the bucket suspension structure;

said leg means each having a length selected to accommodate any variations in the spacing between the first and second sets of the aligned holes of the bracket means of the bucket suspension structure.

4,958,982

DEVICE FOR TRANSFERRING ITEMS

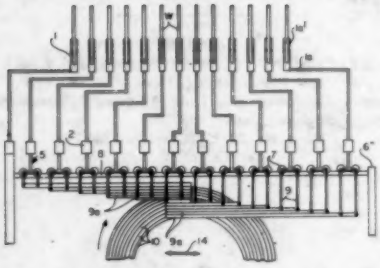
Gérard Champet, Saint Just Saint Rambert, and Gilles Charpille, Saint Etienne, both of France, assignors to Centre Stephanois de Recherches Mecaniques Hydromecanique et Frottement, France

Filed Feb. 24, 1989, Ser. No. 315,265

Claims priority, application France, Feb. 26, 1988, 88 02888

Int. Cl.[5] B65G *65/00*

U.S. Cl. 414—751 **5 Claims**



1. A device for transferring a plurality of vertically positioned spaced wafers from a first support means to a second remote support means comprising:

said first support means having a separate gripping means for each wafer;

each of said gripping means including upright clamping mens adapted and constructed to releasably clamp separately each of said wafers therebetween;

each of said gripping means being mounted on a separate spaced wheeled movable carriage means;

each of said carriage means mounted on a track means horizontally mounted on said first support means;

each of said carriage means being affixed to separate rack means;

rotatably driven cog gear means comprising a plurality of cog wheels each of a different diameter and a different pitch being mounted axially one to the other;

each of said rack means being operatively connected individually to one of said cog wheels whereby said carriage means may be given translation motion when said cog gear means is rotated;

said first support means having moving means whereby said support means is capable of being separately moved horizontally and vertically.

4,958,983

INDEXING CONVEYOR FOR WORKPIECE BLANKS

Alfred C. Fisch, Clarkston, Mich., assignor to Oakland Engineering, Inc., Pontiac, Mich.

Division of Ser. No. 223,529, Jul. 25, 1988, abandoned. This application Jul. 3, 1989, Ser. No. 375,000

Int. Cl.[5] B65G *57/30*

U.S. Cl. 414—795.3 **8 Claims**

1. Apparatus for stacking preformed workpiece blanks comprising:

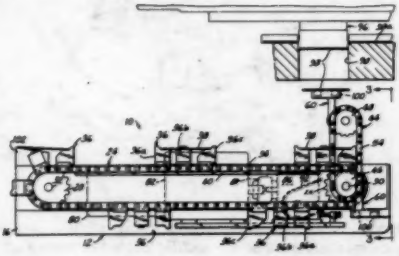
conveyor means for indexingly transporting preformed workpiece blanks to a stacker station,

a pair of opposed support means carried above said conveyor means at said workpiece station, said pair of support means being separated by a gap to permit stacking of workpiece blanks therebetween,

finger means slidably carried by each of said support means for lateral motion with respect to said gap, each of said finger means having cam surface means facing said conveyor means,

spring means urging each said finger means into said gap, and

means positioned beneath said conveyor means at said stacker station for raising a workpiece blank against force of said cam surfaces so as to urge said finger means against said spring means out of said gap and permit entry of the workpiece blank between said support means, said finger means being urged by said spring means into said gap to support the workpiece blank between said support means,



said conveyor means comprising a vertical conveyor including a first pair of vertically spaced sprockets, an endless first chain trained in a loop over said vertically spaced sprockets, and a workpiece finger cantilevered from said first chain, said workpiece finger being constructed to receive a workpiece blank and to convey said workpiece blank in a vertical direction as a function of motion of said first chain,

a horizontal conveyor including a second pair of horizontally spaced sprockets, an endless second chain trained in a loop over said horizontally spaced sprockets and a workpiece hand carried by said second chain, said workpiece hand being constructed to receive a workpiece blank and to convey said workpiece blank in a horizontal direction as a function of motion of said second chain, and

drive means including means coupling one sprocket in each of said pairs of sprockets to a common drive mechanism and synchronizing motion of said chains such that workpieces are transmitted between said finger and said hand at the point of intersection between said horizontal and vertical directions.

4,958,984

FUEL PUMP HAVING IMPROVED SHAFT/IMPELLER COUPLING

Tomio Aoi, and Toshihiro Kameda, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 8, 1989, Ser. No. 349,184

Claims priority, application Japan, May 25, 1988, 63-68956[U]

Int. Cl.[5] F04D *29/18, 29/20*

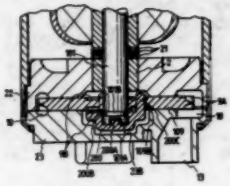
U.S. Cl. 415—55.1 **, Claims**

1. In a fuel pump of the type comprising a pump casing having a pump chamber therein, an impeller disposed in the pump chamber, a rotatable main shaft one end of which is connected to the center of the impeller to rotate said impeller,

and a means for driving the main shaft, the improvement comprising

a coupler engaging mechanically with both the impeller and the main shaft to prevent rotation of said impeller relative to said main shaft;

said impeller having a central hole defined at the center thereof for receiving the main shaft, said impeller also having at least one pin hole therein spaced from said central hole;



a first engaging portion formed on an end surface of the main shaft adjacent the portion of said main shaft which engages said central hole; and

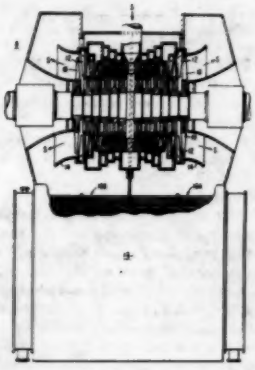
a pin formed integrally with the coupler and engaging with said pin hole in said impeller, said coupler also having a second engaging portion which engages with said first engaging portion on said main shaft, the cross section of each of said first and second engaging portions being noncircular in a plane perpendicular to said main shaft.

4,958,985

PERFORMANCE LOW PRESSURE END BLADING

Joseph Davids, Maitland, and George J. Silvestri, Jr., Winter Park, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Mar. 1, 1989, Ser. No. 317,495
Int. Cl.[5] F04D 29/56
U.S. Cl. 415—101 5 Claims



1. A method for optimizing thermodynamic performance of a steam turbine by matching a last stage blade flow area to condenser pressure without changing blade sizing and shape comprising the step of adjusting blade angular orientation to set the gaging for an optimum flow area for the designed condenser pressure.

4,958,986

CENTRIFUGAL ACTION TURBINE

Pierre Bousenges, 4, rue Bérenger, F-38000 Grenoble, France

PCT No. PCT/FR88/00081, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO88/06239, PCT Pub. Date Aug. 25, 1988
PCT Filed Feb. 16, 1988, Ser. No. 297,861
Claims priority, application France, Feb. 20, 1987, 87 02251
Int. Cl.[5] F01B 25/06; F03B 3/18
U.S. Cl. 415—188 18 Claims

1. Centrifugal action turbine comprising:

an axial fluid supply pipe;

a distributor placed at one end of said fluid supply pipe and adapted to form centrifugal jets of fluid deviated with respect to the radial direction and spaced in the peripheral direction;

a bucket rotor disposed concentrically to and around said distributor, said rotor including inner channels having inlets facing the peripheral surface of the distributor such that said jets pass through the rotor and cause rotation thereof;

said jets being formed through continuously convergent deviating channels within said distributor, said channels of the distributor having inlets turned toward the fluid supply pipe and outlets at the peripheral surface of the distributor;

said rotor being spaced a distance from the peripheral surface of the distributor such that jets flowing out of the distributor and through the rotor are aerated between the distributor and the rotor;

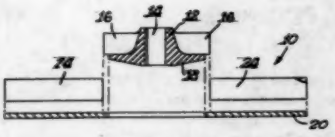
and an obturator disposed between the distributor and the rotor, said obturator being movable to adjust the cross-section of the outlets of the channels of the distributor.

4,958,987

MATERIALS HANDLING FAN IMPELLER

John G. S. Billingsley, Newark, Del., assignor to Precision Cutters, Inc., Phillipsburg, N.J.

Filed Jul. 20, 1989, Ser. No. 382,298
Int. Cl.[5] F01D 5/14
U.S. Cl. 416—213 A 7 Claims



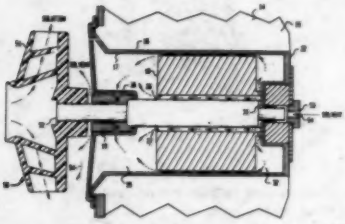
1. In a materials handling fan, an impeller comprising a central thickened hub, said hub including an axial bore for receiving a drive shaft therein, a web section perpendicular to said bore, and a plurality of blades mounted perpendicular to said web and radially extending from said hub, an annular backplate distinct from and secured to the periphery of said web to extend the effective diameter of the assembly and a

plurality of blade extensions secured to the backplate and to the hub blades.

4,958,988
MOTOR DRIVEN PUMP FOR PUMPING VISCOUS SOLUTIONS

Mordechai Regev, Nes Ziona, Israel, assignor to Ormat Turbines, Ltd., Yavne, Israel

Continuation of Ser. No. 780,597, Sep. 26, 1985, abandoned. This application Jun. 17, 1987, Ser. No. 63,755
Int. Cl.[5] F04B *17/00*
U.S. Cl. 417—53 **17 Claims**

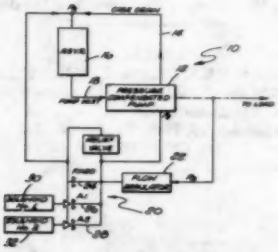


11. A method for lubricating a bearing of a motor driven pump that pumps a solution of a solute in a solvent, said method comprising the step of applying only pressurized solvent to said bearing whereby the solvent leaks through said bearing, lubricates the same, and prevents said solution from entering said bearing.

4,958,989
DIGITAL FLUID CONTROL OF A PRESSURE COMPENSATED PUMP

William Frantz, Northridge, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 30, 1989, Ser. No. 428,717
Int. Cl.[5] F04B *1/26*
U.S. Cl. 417—222 **10 Claims**



1. An apparatus for selecting and controlling the output of a pressure compensated pump during operation, comprising:

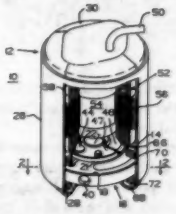
(a) a pressure compensated pump having a servovalve assembly including a compensator valve spring and a compensating piston, said pressure compensating pump further having a control inlet in fluid communication with said inlet, said control inlet for introducing a digitally selected reference fluid pressure (P_E), said P_E and said spring cooperating to establish a reference force, opposed by an output pressure of the pump, said reference force for positioning said piston within said servovalve assembly depending on the selected P_E, thus controlling the output of said pump; and

(b) means for producing said P_E in response to user selected digital commands.

4,958,990
MOTOR-COMPRESSOR WITH MEANS TO REDUCE NOISE

James F. Gordon; Owen H. Scheldorf, both of Louisville, Ky., and Gary O. Scheldorf, Greenville, Ind., assignors to General Electric Company, Louisville, Ky.

Filed Sep. 29, 1989, Ser. No. 414,369
Int. Cl.[5] F04B *39/12*; F04C *29/00*
U.S. Cl. 417—410 **6 Claims**



1. A hermetically sealed compressor unit including:

a hermetically sealed casing having a side wall with a cylindrical inner surface; an electric motor positioned within said casing and including a stator with a cylindrical outer wall having an interfering fit with said casing side wall inner surface;

a rotary compressor positioned within said casing to be driven by said motor, said compressor including a cylinder spaced from said motor and having a cylindrical outer wall; said cylinder outer wall being welded to said casing side wall at selected points spaced around said side wall; and

at least one stiffening ring positioned adjacent said cylinder; said at least one ring including a cylindrical outer wall with a larger diameter than said cylinder outer wall and having an interfering fit with said casing side wall inner surface.

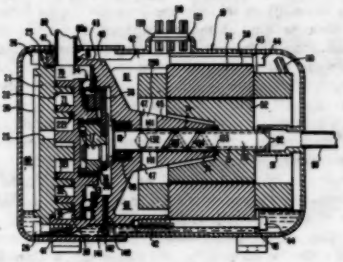
4,958,991
SCROLL TYPE COMPRESSOR WITH DISCHARGE THROUGH DRIVE SHAFT

Kazuto Kikuchi, Saitama, Japan, assignor to Sanden Corporation, Gunma, Japan

Filed Feb. 28, 1989, Ser. No. 316,805
Claims priority, application Japan, Feb. 29, 1988, 63-44497
Int. Cl.[5] F04C *18/04, 29/02*
U.S. Cl. 418—55.6 **18 Claims**

1. In a scroll type compressor with a hermetically sealed housing, said compressor comprising a fixed scroll disposed within said housing, said fixed scroll having a first end plate from which a first spiral element extends, an orbiting scroll having a second end plate from which a second spiral element extends, said first and second spiral elements interfitting at an angular and radial offset to form a plurality of line contacts which define at least one pair of sealed off fluid pockets, a drive mechanism operatively connected to said orbiting scroll to effect orbital motion of said orbiting scroll, a rotation preventing means for preventing the rotation of said orbiting scroll during orbital motion whereby the volume of said fluid pockets changes to compress fluid in said pockets, said drive mechanism including a drive shaft rotatably supported within an inner block member, said inner block member fixedly secured to said housing, said first end plate of said fixed scroll

and said inner block member forming a suction chamber therebetween, a discharge chamber formed exterior to the suction chamber between the outer surfaces of said first end plate and said inner block member and the interior surfaces of said housing, said first and second spiral elements disposed in said suction chamber, the improvement comprising:



said drive shaft having an axial bore and at least one radial bore extending through the surface of said drive shaft and linking said axial bore to said discharge chamber, said housing having an outlet, said axial bore having an opening isolated from said discharge chamber, said opening coupled to said outlet.

4,958,992

VARIABLE CAPACITY SWIVELLING VANE PUMP

Gerhard Winiger, Zollbrück, Switzerland, assignor to Notron Engineering, Zollbruck, Switzerland

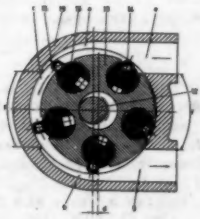
PCT No. PCT/CH87/00140, § 371 Date Jun. 16, 1988, § 102(e) Date Jun. 16, 1988, PCT Pub. No. WO88/03229, PCT Pub. Date May 5, 1988

PCT Filed Oct. 13, 1987, Ser. No. 219,068

Claims priority, application Switzerland, Oct. 27, 1986, 4252/86-6

Int. Cl.[5] F04C *2/344, 15/00*

U.S. Cl. 418—29 **23 Claims**



1. A variable capacity swivelling vane pump for conveying a medium having a pump casing, an inlet, an outlet, a pump channel with suction chamber, a sealing chamber, an outlet chamber, and a central shaft, said pump having a radially adjustable rotor with vanes, said rotor mounted on a rotor support for rotation in an eccentric manner within said sealing chamber, said vanes sealing said suction chamber during the rotation of the rotor, characterized in that said rotor rotates within a rotor cage in an eccentric manner about said shaft, said rotor cage having an internal circumferential surface, said rotor including rotatable vane receivers having said vanes mounted for reciprocal movement within for maintaining contact with said internal circumferential surface during the rotation of said rotor by a swivelling-stroke movement and accordingly seal the entire of said internal circumferential surface without said rotor support coming into contact with the medium conveyed.

4,958,993

SCROLL COMPRESSOR WITH THRUST SUPPORT MEANS

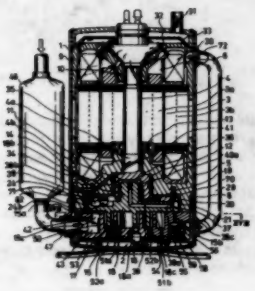
Katuharu Fujio, Kouga, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Dec. 28, 1988, Ser. No. 291,233

Claims priority, application Japan, Dec. 28, 1987, 62-332005; Jun. 28, 1988, 63-159990; Jun. 28, 1988, 63-159996

Int. Cl.[5] F04C *18/04, 29/02*

U.S. Cl. 418—55.3 **13 Claims**



1. A scroll compressor comprising:

a stationary member;

a first scroll member held by said stationary member;

a second scroll member which is orbitably held from said stationary member and to be engaged with said first scroll member, to form compression chambers;

driving means which is held by said stationary member and makes orbiting motion to drive said second scroll member;

supporting means which is movably held and urged from said stationary member to support thrust force of said second scroll member against said first scroll member within a predetermined stroke in an axial direction of said scroll members, the smallest gap between said supporting means and said first scroll member being larger than thickness of a part of said second scroll member put therebetween; and

rotation-prevention means which is movably held by said supporting means and engaged with said second scroll member to prevent said second scroll member from rotating.

4,958,994

GEAR MACHINE FOR A PUMP OR ENGINE HAVING BEARING MEMBERS WITH CIRCUMFERENTIAL RELIEF GROOVES

Klaus Griese, Kupferzell; Claus Jöns, Sachsenheim; Karl-Heinz Müller, Vaihingen; Rudolf Müller, Remseck, and Werner Mühlbauer, Schwieberdingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

PCT No. PCT/DE88/00007, § 371 Date Jun. 26, 1989, § 102(e) Date Jun. 26, 1989, PCT Pub. No. WO88/05501, PCT Pub. Date Jul. 28, 1988

PCT Filed Jan. 7, 1988, Ser. No. 376,181

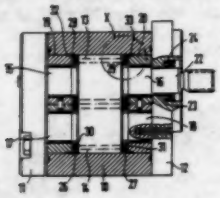
Claims priority, application Fed. Rep. of Germany, Jan. 16, 1987, 3701099

Int. Cl.[5] F04C *2/18, 15/00*

U.S. Cl. 418—132 **5 Claims**

1. A gear machine having a high-pressure side and a low-pressure side, comprising two meshing gears having two opposing lateral surfaces, a plurality of shaft journals on which

said gears are mounted, each of said meshing gears being mounted on at least one of said shaft journals, a plurality of bearing members in which said shaft journals are supported, a sealing plate located between at least one of said lateral surfaces of said gears and an adjacent one of said bearing members and a seal arrangement located between each of said sealing plates and said adjacent bearing member, said sealing plate and said seal arrangement being structured so that said sealing plate



is brought into sealing contact with said lateral surface of said gear by an axially-acting pressure field formed between said sealing plate and said bearing member and so that said seal arrangement acts to limit said axially-acting pressure field, each of said bearing members having a circumferentially-extending relief groove in its outer circumference spaced from the adjacent to said sealing plate which connects and communicates with said low-pressure side of said gear machine when said gear machine is under load.

4,958,995

VANE PUMP WITH ANNULAR RECESSES TO CONTROL VANE EXTENSION

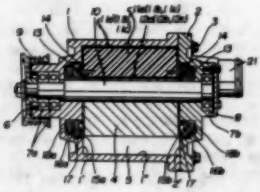
Hiroshi Sakamaki; Yukio Horikoshi; Takeshi Jinnouchi, and Kenji Tanzawa, all of Sakado, Japan, assignors to Eagle Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 75,006, Jul. 17, 1987, abandoned, and a continuation-in-part of Ser. No. 110,919, Oct. 21, 1987, abandoned, and a continuation-in-part of Ser. No. 113,568, Oct. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 115,677, Oct. 30, 1987, abandoned. This application May 23, 1988, Ser. No. 197,548

Claims priority, application Japan, Jul. 22, 1986, 61-170903; Jul. 22, 1986, 61-111490[U]; Oct. 23, 1986, 61-161610[U]; Oct. 23, 1986, 61-161609[U]; Nov. 4, 1986, 61-168147[U]; Nov. 4, 1986, 61-168145; Nov. 14, 1986, 61-269961; Nov. 14, 1986, 61-269960[U]; Nov. 17, 1986, 61-271934; Nov. 21, 1986, 61-178288[U]; Nov. 21, 1986, 61-178287[U]; Nov. 21, 1986, 61-276689; Nov. 21, 1986, 61-276690; Dec. 3, 1986, 61-185571[U]

Int. Cl.[5] F04C *2/344*

U.S. Cl. 418—152 **19 Claims**



1. A vane pump comprising a housing means having a rotor chamber, said rotor chamber having an inner annular surface, a rotor means rotatably mounted in said rotor chamber, said inner annular surface having a chamber axis which is eccentric relative to the axis of rotation of said rotor means, said rotor means having a plurality of generally radially disposed vane slots, a plurality of vane means slidably mounted in said vane slots and operable to define variable volume chambers for effecting a pumping action as said rotor means rotates and said vane means move generally radially in and out of said vane slots, said vane means having longitudinal ends, projection means projection from said longitudinal ends, said housing means having an annular channel coaxial with said chamber axis, said housing means having a housing portion disposed radially inwardly of said channel and having an outer peripheral surface defining an inner peripheral surface of said channel, said channel having an outer peripheral surface and a bottom surface, both formed by said housing means, said outer peripheral surface being spaced radially outwardly of said inner peripheral surface, annular ring means disposed in said channel, bearing means within said channel rotatably supporting said ring means within said channel, said ring means having inner and outer peripheral surfaces juxtaposed to the respective inner and outer peripheral surfaces of said channel, said ring means having a bottom surface juxtaposed to said bottom surface of said channel, with said chamber axis, annular ring means disposed in said channel, bearing means within said channel rotatably supporting said ring means within said channel, said ring means having an annular groove coaxial with said chamber axis, said groove having an inner cylindrical surface disposed to be engaged by said projection means such that during rotation of said rotor means, the resulting centrifugal force urges said vane means radially outwardly of the respective vane slot such that said projection means engages said inner cylindrical surface, said inner cylindrical surface being disposed to limit the extent of outward radial movement of said vane means from its respective vane slot to preclude sliding contact between said vane means and said inner annular surface of said housing means, said channel having inner and outer peripheral surfaces and a bottom surface, said ring means having inner and outer peripheral surfaces juxtaposed to the respective inner and outer peripheral surfaces of said channel, said ring means having an outer end surface juxtaposed to said rotor means and an inner end surface juxtaposed to said bottom surface of said channel, said ring means having an intermediate peripheral surface disposed radially intermediate said inner and outer peripheral surface of said ring means, said ring means having an intermediate transverse surface axially intermediate said outer and inner end surfaces, said bearing means being disposed between said intermediate peripheral surface of said ring means and said inner peripheral surface of said channel and between said intermediate transverse surface of said ring means and said bottom surface of said channel.

4,958,996

ROTARY DEVICE HAVING INTER-ENGAGING INTERNAL AND EXTERNAL TEETH

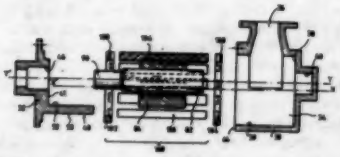
Sylvain Janssen, Neuilly; Claude Foulnaud, Montrouge, and Gérard Lagarde, Longjumeau, all of France, assignors to Schlumberger Industries, S.A., Montrouge, France

Filed May 23, 1989, Ser. No. 355,581

Claims priority, application France, May 25, 1988, 88 06920

Int. Cl.[5] F04C *2/10*

U.S. Cl. 418—152 **4 Claims**



1. A rotary device for interacting with a flow of liquid, the device comprising:

a casing having a cavity defined by a substantially cylindrical side wall, said cavity being in communication with an inlet opening and an outlet opening, said casing containing:

a first rotary member having a first axis of rotation (YY') and external teeth; and

a second rotary member surrounding the external teeth of said first rotary member and guided to rotate about a second axis (XX') parallel to the first axis, said second member comprising two circular rings mounted inside said casing to occupy two respective planes perpendicular to said first axis (YY'), and a plurality of longitudinal components mounted between said rings to lie parallel with the second axis (XX'), each of said longitudinal components having a transverse cross-section in the shape of a gear tooth for meshing with the teeth of said first member, said rings having regularly spaced-apart, radially outwardly opening notches around their peripheries in order to receive the ends of said longitudinal components, said longitudinal components being freely engaged within said notches to allow a slidable fit between said components and said rings, and being radially maintained within said notches by said cylindrical side wall.

4,958,997

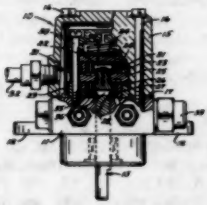
TWO-STAGE GEAR PUMP WITH IMPROVED SPUR GEAR MOUNTING

Frank L. Harwath, Rockford, Ill., assignor to Suntec Industries Incorporated, Rockford, Ill.

Filed Sep. 27, 1989, Ser. No. 413,121

Int. Cl.[5] F04C 2/10; F16B 3/00

U.S. Cl. 418—171 **4 Claims**



1. A gear pump comprising a body, an elongated shaft rotatably supported by said body and having an axially facing free end, a gear telescoped onto the free end portion of said shaft with a press fit, a slot formed radially through the free end portion of said shaft and opening axially out of the free end of said shaft, said slot extending along said shaft at least to a point within said gear and terminating in a closed end, said slot dividing the free end portion of said shaft into two cantilevered halves, a key disposed within said slot and having means engageable with said gear to positively couple said gear and said shaft for rotation in unison, and an annular groove formed circumferentially around the outer periphery of said shaft at the closed end of said slot to reduce stress on said two cantilevered halves of said shaft, the closed end of said slot being located between the ends of said grooves.

4,958,998

GLASSLIKE CARBON COMPOSITE MATERIAL AND METHOD OF PREPARING THE SAME

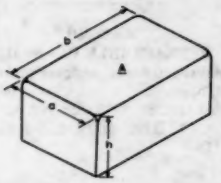
Michihide Yamauchi, Osaka; Hiroyuki Nagamori, Tochigi; Masanobu Wakasa, and Atsushi Ishikawa, both of Wakayama, all of Japan, assignors to Kao Corporation, Tokyo, Japan

Filed Nov. 10, 1987, Ser. No. 119,002

Claims priority, application Japan, Nov. 10, 1986, 61-268444; Sep. 9, 1987, 62-227115

Int. Cl.[5] C01B 31/00

U.S. Cl. 423—445 **5 Claims**



1. A glasslike carbon composition material comprising:

a glasslike carbon material which containing no graphite as the principal component; and

ultrafine particles as a reinforcing component having an average particle size of 1 μm or less, said particles being of one or more compounds selected from the group consisting of metal oxides, metal nitrides, metal carbides and metal borides, the proportion of said ultrafine particles being in the range of 0.5% to 20% of the volume of said glasslike carbon material.

4,958,999

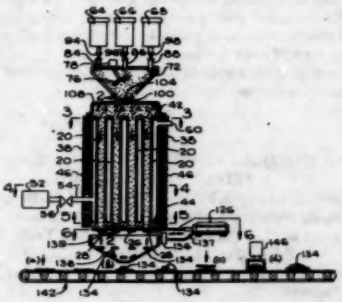
APPARATUS FOR PRODUCING POLYMERIZED PLUGS

Cristina Liscomb, Milford, Pa., and Anthony J. Buzzelli, Wallkill, N.Y., assignors to Dow Corning Corporation, Midland, Mich.

Filed Dec. 19, 1988, Ser. No. 286,471

Int. Cl.[5] B29C 35/04, 39/30

U.S. Cl. 425—110 **2 Claims**



2. An apparatus for producing polymerized plugs having a circumferential sleeve, comprising:

at least one flexible sleeve having polymerization starting materials encased within said sleeve;

a plurality of reaction tubes, the reaction tubes having an inlet opening and an outlet opening, the inlet opening being at a higher elevation than the outlet opening, whereby said flexible sleeve can be passed through said inlet opening and will travel through said tube to said outlet opening at least in part by gravity feed;

means for heating the reaction tubes, comprising means for

contacting said tubes with a hot fluid, whereby said starting materials within said sleeve will polymerize as they travel through said reaction tubes, said means for contacting said tubes with a hot fluid comprising an enclosure having a fluid inlet communicating with a source of said hot fluid, and a fluid outlet, the tubes being disposed at least in part within said enclosure, whereby the tubes will be contacted by hot fluid travelling from said fluid inlet to said fluid outlet, said tubes being detachably mounted within said enclosure, whereby tubes of differing inside diameter can be mounted within the enclosure to produce plugs having differing diameters; and

cutting means for cutting said sleeve into plugs of predetermined length as the sleeve exits the outlet opening.

4,959,000

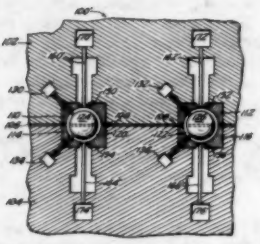
RETRACTABLE PIN MOLD

John P. Giza, Acushnet, Mass., assignor to Acushnet Company, New Bedford, Mass.

Filed Oct. 31, 1989, Ser. No. 429,522

Int. Cl.[5] B29C *45/14, 45/36, 45/72*

U.S. Cl. 425—116 **2 Claims**



1. In a golf ball retractable pin mold having a top mold plate having a plurality of top half molds therein and a bottom mold plate having a plurality of bottom half molds therein, said plurality of top half molds in said top plate in registration with said plurality of bottom half molds in said bottom mold plate and each of said top and bottom half molds forming a substantially spherically shaped mold cavity, each of said top half molds and said bottom half molds joining at the equator of the spherically shaped mold cavity, the improvement comprising:

(a) a gate positioned at the pole of each top half mold and at the pole of each bottom half mold; and

(b) a valve at each gate to control the flow of fluid into each spherical shaped mold cavity.

4,959,001

BLOW MOLDING MACHINE WITH ACCUMULATOR WAITING TIME CONTROL

Jacques A. E. Langlois, Vellmar; Heinrich M. G. Bergmann, and Wolfgang Nuha, both of Kassel, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,581

Claims priority, application Fed. Rep. of Germany, Mar. 24, 1988, 3809856

Int. Cl.[5] B29C *49/04*

U.S. Cl. 425—147 **10 Claims**

1. A blow molding machine for the blow molding of articles, comprising:

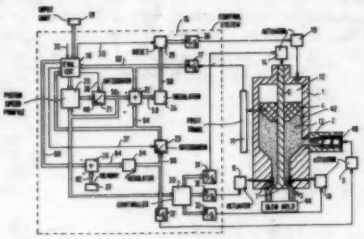
an accumulator head, which is connected to an extruder having a controllable rotational speed for supplying a flow of synthetic material for filling the accumulator head, and from which in a filled condition a discharge piston discharges the synthetic material in a discharge stroke through an annular slit-shaped discharge opening to produce a preform having a wall thickness;

a blow mold means for receiving the preform and forming a blown article from the preform in a blow molding sequence; and

a control means which after completion of a last prior blow molding sequence and the filling of the accumulator head, derives a piston positioning signal for regulating the position of the discharge piston in a next discharge stroke, said control means comprising:

actual position measuring means for measuring the actual position of the discharge piston;

means responsive to the actual position measuring means for forming a comparative signal from the difference between the actual position and a set position of the discharge piston, the set position being determined by set point values for an initial piston position and a final piston position, respectively corresponding to a set point accumulator head contents level and a set point accumulator head cushion for said synthetic material, and by integration



from a previously specified discharge piston speed set point profile provided for a desired wall thickness profile of the preform

means for forming an influx signal which corresponds to the change in volume of synthetic material flowing from the extruder (2) to replace the discharged contents of the accumulator head (1) and for superimposing said influx signal on said comparative signal;

means for using an influx signal value determined at the end of a last prior discharge stroke for correcting the set point values for the initial piston position and the final piston position for the next discharge stroke; and

means for controlling the rotational speed of the extruder (2) in a manner for producing a predetermined waiting time between completion of the last prior blow molding sequence and reaching a set point contents level at said accumulator head.

4,959,002

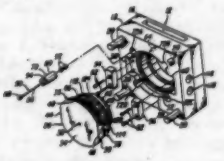
INSERTS FOR INJECTION MOLD MACHINE

Ronald E. Pleasant, 665 N. Detroit Street, Kenton, Ohio 43326

Division of Ser. No. 89,274, Aug. 25, 1987, Pat. No. 4,828,479. This application May 8, 1989, Ser. No. 348,714

Int. Cl.[5] B29C *45/40*

U.S. Cl. 425—192 R **15 Claims**



1. A quick-changeover mold insert for use in an injection molding machine, said machine having a pair of relatively movable mold sides forming a mold cavity therebetween, said mold sides being separable to expose confronting parts of said mold sides, one of said mold sides comprising a mold plate

having a surface confronting the other mold side which surface is exposed when said mold sides are separated, said mold plate having an insert-receiving hole adapted to receive a mold insert, and said machine having insert retainer and lifter means on said mold plate for clamping said mold insert to said mold plate and for lifting said mold insert partly out of said insert-receiving hole, said mold insert comprising:

a generally cylindrical, one-piece body stepped along its length, said body comprising longitudinally-adjacent sections of different diameters including a first diameter locking groove section having an outer peripheral surface, an end face, and locking means forming locking groove segments at portions of said outer peripheral surface, said locking groove segments being engageable by said insert retainer and lifter means for clamping said mold insert to said mold plate with said end face confronting the other mold side and also for partly removing said mold insert from said mold plate, and said sections further comprising a second diameter liquid channel section, said liquid channel section having a liquid channel groove extending substantially completely therearound, said liquid channel section being smaller in diameter than said locking groove section, and a pair of axially spaced O-ring seal-receiving groove means for partly receiving O-rings located on opposite sides of said liquid channel groove.

4,959,003

DEVICE FOR DIE-CASTING OF CONCRETE GOODS SUCH AS BLOCK STONES IN A CELLULAR MOULD

Agner R. Gregersen, Viborg, Denmark, assignor to KVM Industrimaskiner A/S, Kjellerup, Denmark

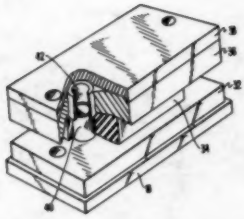
PCT No. PCT/DK88/00032, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06084, PCT Pub. Date Aug. 25, 1988

PCT Filed Feb. 23, 1988, Ser. No. 263,795

Claims priority, application Denmark, Feb. 23, 1987, 899/87

Int. Cl.[5] B28B *1/08, 3/02, 13/02;* B30B *5/00*

U.S. Cl. 425—346 **4 Claims**



1. A system for die casting of concrete goods, comprising a cellular casting mould having a plurality of cells and means for supplying concrete thereto for filling the cells and a superjacent dolly including a common base member having a plurality of resiliently yielding, protruding piston portions, each piston portion having at its lower end a load plate of a shape corresponding to the cross sectional shape of a corresponding cell, which load plates are pressable down into the cells for compressing the concrete therein, and which piston portions are mutually axially movable for providing that the load plates assume variable final levels due to differently compressible cell fillings, and wherein each of the piston portions comprises the load plate having a thrust pad fixed thereto, upon which thrust pad a resiliently compressible unit is fixed, and upon which resiliently compressible unit a plate member is fixed, which plate member is for mounting the resiliently yielding piston potions onto the common base member of the dolly by means of a lower carrier plate of the dolly.

4,959,004

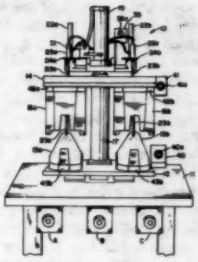
PAD-FORMING DEVICE WITH HOLD-DOWN KNOCKOUT PIN

Stanley M. Nowakowski, Cranford, N.J., assignor to Sure-Cast Pattern Works, Inc., Cranford, N.J.

Filed Nov. 30, 1988, Ser. No. 278,042

Int. Cl.[5] B29C *51/30*

U.S. Cl. 425—397 **16 Claims**



1. A pad-forming device for shaping a piece of resilient material, said pad-forming device comprising:

a. a shaping member;

b. a molding member vertically oriented with respect to said shaping member, said shaping member and said molding member being movable relative to one another between an open position wherein said members are remote from one another and a closed position wherein said members are juxtaposed with one another;

c. a hold-down element; and

d. hold-down engagement means for positioning said hold-down element at an advanced position wherein said hold-down element lies at a distance from said shaping member while said members are in said open position so that the piece of resilient material can be inserted and held between said hold-down element and said shaping member prior to movement of said members to said closed position, said hold-down element having vertical play means for providing a range of free upward vertical movement so that when in said advance position, said hold-down element can be moved upwardly through said range to accommodate pieces of resilient material having different thicknesses.

4,959,005

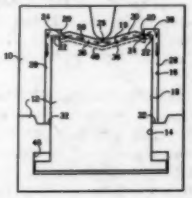
SELF-ALIGNING MOLD FOR INJECTION MOLDING OF HOLLOW PLASTIC PRODUCTS

Jens O. Sorensen, Rancho Santa Fe, Calif., assignor to Primtec, Rancho Santa Fe, Calif.

Filed Feb. 23, 1989, Ser. No. 314,436

Int. Cl.[5] B29C *45/04*

U.S. Cl. 425—577 **29 Claims**



18. A mold for injection molding, laminating and controlling

the dimensions of a hollow plastic product having a rim, a base and a side wall therebetween, comprising

a first mold part and a second mold part, which when assembled by axial movement with respect to each other, define a first mold cavity for forming said plastic product;

a third mold part, which, when assembled with the first mold part by axial movement with respect to each other while the first mold part is retaining a first layer of said plastic product formed by plastic material inserted into the first mold cavity, defines a second mold cavity for forming a second layer of said plastic product;

wherein the base-forming portion of the first layer of plastic material retained by the first mold part includes a brink or a labrum formed in the first mold cavity by said second mold part, with said brink of said labrum protruding in a direction toward the third mold part, and the base-forming portion of the third mold part includes a labrum or a brink respectively that protrudes in a direction toward the first mold part to define a throttle situated between said brink and said labrum, the throttle having a variable width, which at any throttle position is defined by the distance between said brink and said labrum; and

wherein the throttle width varies when the first and third mold parts are not axially aligned to thereby, during injection, admit more material into the side wall-forming portion of the second mold cavity that is the thinnest as a result of said axial misalignment, for the purpose of forcing the first mold parts into axial alignment.

23. A mold for injection molding and laminating a hollow plastic product having a rim, a base and a side wall therebetween, comprising

a first mold part and a second mold part, which when assembled by axial movement with respect to each other, define a first mold cavity for forming said plastic product;

wherein the first mold cavity includes primary flow channels for directing injected plastic material from the base-forming portion of the first mold cavity toward the rim-forming portion of the first mold cavity, with the first mold cavity thickness at the primary flow channels being generally thicker than the prevailing mold cavity thickness between the primary flow channels;

the mold further comprising

a third mold part, which, when assembled with the first mold part by axial movement with respect to each other while the first mold part is retaining a first layer of said plastic product formed by plastic material inserted into the first mold cavity, defines a second mold cavity for forming a second layer of said plastic product;

wherein the first layer of plastic material is so shaped by the first mold cavity as to define secondary flow channels in the second mold cavity for directing plastic material injected into the second mold cavity from the base-forming portion of the second mold cavity toward the rim-forming portion of the second mold cavity.

4,959,006

APPARATUS RELATING TO A PREFORM WITH GEODESIC REINFORCEMENT RING

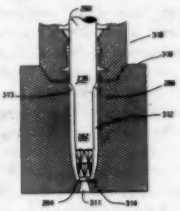
Frederick J. Feddersen, Londonderry, and Jizu J. Cheng, Manchester, both of N.H., assignors to FMT Holdings, Incorporated, Londonderry, N.H.

Continuation-in-part of Ser. No. 420,143, Oct. 11, 1989, which is a continuation-in-part of Ser. No. 373,046, Jun. 28, 1989. This application Nov. 22, 1989, Ser. No. 441,065

Int. Cl.[5] B29C *45/26, 49/06*

U.S. Cl. 425—533 **11 Claims**

1. A plastic mold-core rod combination for forming an injection molded preform for producing blow molded plastic containers which comprises: a female preform mold having an interior surface and a core rod having an exterior surface together defining a mold cavity having the shape of the preform, said preform having a neck portion defining an opening; a tubular sidewall portion depending therefrom; and an integral base structure depending from the tubular sidewall portion to a closed end; said preform having an outside wall face and an inside wall face, with at least one of the inside wall face and the outside wall face of the base structure having integrally formed thereon a plurality of filets, extending longitudinally of the preform and contacting one another to define a continuous reinforcing ring of varying thickness spaced from the closed



end and circumscribing the base structure, wherein said filets decrease progressively in width and radial thickness at least from said reinforcing ring toward said closed end, the preform being capable of forming a blow molded plastic bottle with a bottom portion having a continuous reinforcing ring of circumferentially continuous alterations in wall thickness with a regularly undulating cross-section along said circumference.

4,959,007

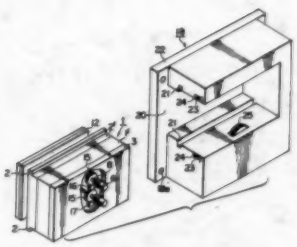
INSERT-TYPE ROTARY CORE MOLD APPARATUS

Kazuhiko Okuyama, Chiba, Japan, assignor to Sumitomo Heavy Industries Ltd., Tokyo, Japan

Filed May 3, 1989, Ser. No. 346,843

Int. Cl.[5] B29C *45/38*

U.S. Cl. 425—577 **4 Claims**



1. A rotary-core mold apparatus comprising:

an insert holder mounted on a first platen of a molding machine;

a mold having a cavity facing the insert holder, said mold being secured to a second platen of said molding machine, one of said first and second platens being stationary and a remaining platen being movable;

an insert mounted detachably on said insert holder;

a rotary core supported rotatably by said insert, said rotary core being adapted to project inside said cavity of said mold when said mold is clamped to said insert holder which has said insert mounted thereon;

a driving source provided on said insert holder; and

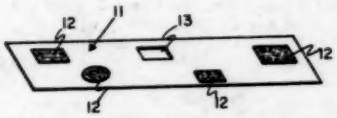
a rotation transmitting mechanism which is provided on said insert and is operatively connected to said driving source when said insert is mounted in said holder, so as to rotate said rotary core.

4,959,008

PRE-PATTERNED CIRCUIT BOARD DEVICE-ATTACH ADHESIVE TRANSFER SYSTEM

William M. Wasulko, Anderson, S.C., assignor to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Apr. 30, 1984, Ser. No. 605,523
Int. Cl.[5] A61F 13/02; H05K 1/02; B44C 1/17
U.S. Cl. 428—40 26 Claims



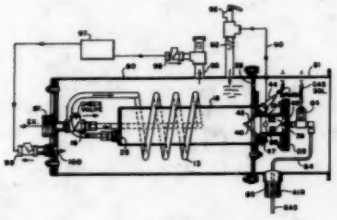
1. A circuit board device attach tape which comprises:
(a) a support film; and
(b) a pattern of curable conductive adhesive releasably affixed to one side of support film, the adhesive pattern being of a size and shape so that when brought into contact with a circuit board, the adhesive is in a pattern suitable for later attachment thereon of surface mounted devices to the circuit board.

4,959,009

PULSE BURNER AND METHOD OF OPERATION

Klaus H. Hemrath, Toledo, Ohio, assignor to Indugas, Inc., Toledo, Ohio

Filed Jun. 26, 1989, Ser. No. 371,002
Int. Cl.[5] F23C 11/00
U.S. Cl. 431—1 42 Claims



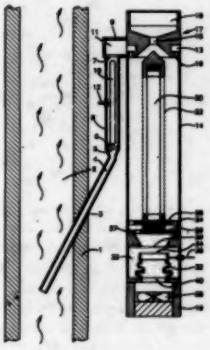
1. A method for generating periodic combustions in a combustion chamber having a one-way combustion air inlet, a one-way or restricted exhaust outlet and an externally actuated fuel inlet, said method comprising the steps of:
(a) admitting combustion air into said chamber during a first, finite period;
(b) thereafter admitting fuel into said chamber during a second timed, finite period;
(c) mixing, igniting and combusting said fuel with said combustion air during said second time period;
(d) thereafter beginning the first period by exhausting the products of combustion through said outlet, and
(e) commencing said first timed period immediately upon expiration of said second time period whereby steps a through d are cyclically repeated.

4,959,010

AUTOMATICALLY REGULATED COMBUSTION PROCESS

Heinz Burtscher; Andreas Schmidt-Ott, and Hans-Christoph Siegmann, all of Zurich, Switzerland, assignors to Matter & Siegmann AG, Wohlen, Switzerland

Filed Aug. 20, 1984, Ser. No. 642,346
Claims priority, application Fed. Rep. of Germany, Aug. 24, 1983, 3330509
Int. Cl.[5] F23N 5/00
U.S. Cl. 431—12 9 Claims



1. A combustion process comprising the steps of mixing an organic fuel with an oxygen-containing gas in an adjustable ratio, burning said fuel-gas mixture and thereby producing an exhaust gas containing a plurality of finely dispersed aerosol particles, collecting at least a part of said exhaust gas containing said finely dispersed aerosol particles and exposing said collected exhaust gas and thereby also said finely dispersed aerosol particles at least intermittently to an ultraviolet radiation source, thereby generating positive and negative charge carriers in said exhaust gas solely by means of photoelectrically charging said aerosol particles contained in said exhaust gas, detecting said positive or negative charge carriers to produce a measurement value which reflects the amount of charge of said positive or negative charge carriers, generating a control signal from said measurement value, and adjusting said ratio of said oxygen-containing gas and said fuel to an optimal value in response to said control signal.

4,959,011

ELECTRIC IGNITION SYSTEM

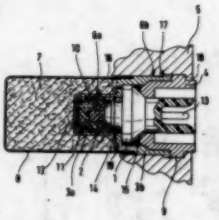
Karl E. Nilsson, Ottobrunn, Fed. Rep. of Germany, assignor to Bayern-Chemie, Gesellschaft für flugchemische Antriebe mbH, Aschau, Fed. Rep. of Germany

Filed Nov. 4, 1988, Ser. No. 267,529
Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738436
Int. Cl.[5] F23Q 7/06
U.S. Cl. 431—263 9 Claims

1. An electric ignition system comprising:
an ignitor;
a base including an electrical contact, said electrical contact being in electrical contact with said ignitor;
a sleeve, said sleeve at least partially surrounding said base and being secured to said base so as to define a cavity, said ignitor being enclosed in said cavity by said sleeve and said base;
a primary ignition powder, said primary ignition powder and said ignitor substantially filling said cavity;
a jacket enclosing said base and said sleeve, said jacket comprising:

a first cylindrical portion including a window and a large axially extending circumferential surface and having a predetermined diameter, said first cylindrical portion being in contact with said sleeve;

a second cylindrical portion including a large axially extending circumferential surface having a predetermined diameter larger than the diameter of said first cylindrical portion;



and a step extending radially and connecting said first cylindrical portion to said second cylindrical portion;

wherein said first cylindrical portion encloses said sleeve, said primary ignition powder and said ignitor, and said base is form fitted with said second cylindrical portion and in abutment with said radially extending step;

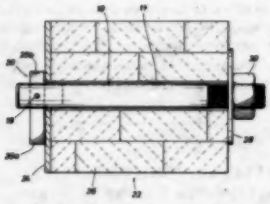
at least one fastening means, said fastening means retaining said base within said second cylindrical portion.

4,959,012

APPARATUS FOR REPAIRING BRICK/REFRACTORY IN A PROCESS HEATER

Gary L. Perfetti, Collinsville, Ill., assignor to Shell Oil Company, Houston, Tex.

Filed Sep. 14, 1989, Ser. No. 407,505
Int. Cl.[5] F27D *23/00*
U.S. Cl. 432—76 **2 Claims**



1. An apparatus for securing loose wall brick or refractory lining in a process heater comprising:

a tension rod, having a threaded end and a slotted end, for insertion into a hole drilled in the wall of said process heater at the location of said loose wall brick;

a pivot plate pivotally secured in said slotted end such that, when said slot is in a vertical position and said pivot plate is unrestrained, said pivot plate will pivot to a vertical position whereby it may be pulled against the outside of said process heater and prevent removal of said tension rod from said hole;

a pressure plate which may be placed over said threaded end of said tension rod and into contact with said wall brick; and

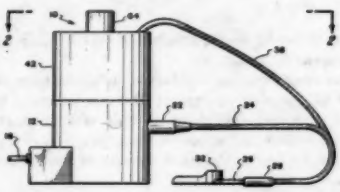
a nut threaded on said threaded end of said tension rod and against said pressure plate whereby said nut can be tightened thereby applying pressure on said heater wall which is between said pivot plate and said pressure plate and preventing further movement of said brick.

4,959,013

RECYCLING, LIQUID MEDIUM TEMPERATURE ALTERING APPARATUS

Fred W. Reynolds, San Pedro, Calif., assignor to Sol Gingi-Pak, A Division of Belport Co., Inc., Camarillo, Calif.

Filed Aug. 29, 1988, Ser. No. 237,373
Int. Cl.[5] A61C *9/00*
U.S. Cl. 433—35 **5 Claims**



1. An apparatus for subjecting an exterior structure to a change in temperature comprising:

an exterior structure to be changed in temperature, said exterior structure having a liquid passage arrangement;

a housing, a pump connected to said housing, a conduit assembly connecting said pump and said liquid passage arrangement;

a liquid, said pump for moving said liquid through said conduit assembly and said passage arrangement;

a reservoir, said liquid to be contained within said reservoir, said reservoir being connected by connecting means to said housing, said conduit assembly connecting with said reservoir, said conduit assembly and said pump and said reservoir and said liquid passage arrangement forming a closed liquid conducting system; and

said reservoir being removably mounted directly on said housing.

4,959,014

DENTAL SPACE MEASURING INSTRUMENT

John J. Sheridan, 1401 Lake St., Unit E-8, Metarie, La. 70005

Filed May 30, 1989, Ser. No. 358,597
Int. Cl.[5] A61C *19/04*
U.S. Cl. 433—72 **24 Claims**

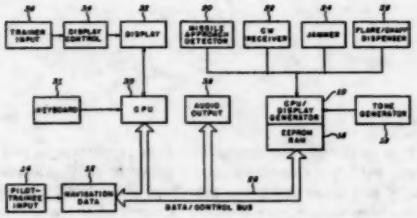
1. A dental space measuring instrument for measuring the spacing between teeth, comprising handle means and at least one first straight portion extending from said handle means and an angulated portion extending from said first straight portion in angular relationship, said first straight portion and said angulated portion further defined by a first plurality of graduated measuring means adapted for insertion between the teeth and measuring the spacing.

4,959,015

SYSTEM AND SIMULATOR FOR IN-FLIGHT THREAT AND COUNTERMEASURES TRAINING

John E. Rasinski, and Christian P. Delong, both of Albuquerque, N. Mex., assignors to Honeywell, Inc., Minneapolis, Minn.

Filed Dec. 19, 1988, Ser. No. 286,116
Int. Cl.[5] G01S 7/40; G09B 9/40
U.S. Cl. 434—2 9 Claims



1. An operator training system and simulator for training in aircraft threat warning and countermeasures, said aircraft having a plurality of sensors for detecting electromagnetic emissions and active elements for countering detected threats, comprising:

(1) countermeasures integration terminal unit, coupled to control said sensors and said active elements, for selectively providing digital data corresponding to a normal cockpit instrument display or to a given threat scenario, said terminal unit further comprising:

(a) flight programmable digital data storage means for receiving data representative of predetermined threat scenarios,

(b) digital image data processor means for generating displayable symbols representative of said threat scenario and corresponding to a normal cockpit instrument display,

(2) trainer input control means for manually generating digital data in order to select a predetermined threat scenario or a normal cockpit instrument display,

(3) display means coupled to receive data from said data storage means and to display scenarios or a cockpit instrument display as selected by said control means,

(4) a computer processor circuit responsive to said control means for controlling said display means,

(5) an audio-frequency generator circuit controlled by information from said computer processor circuit for producing audible signals corresponding to said threat scenario, and

(6) data input means responsive to navigational data and pilot trainee input data for entering information to said computer processor circuit varying in response to the simulated conditions provided through the execution of a selected threat scenario, and for interactively controlling said display means according to said responses,

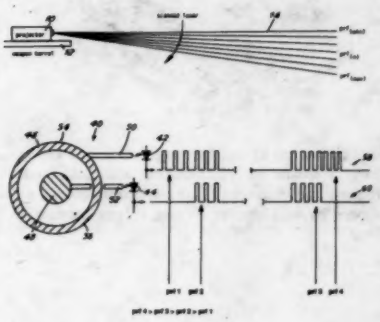
said training system and simulator further comprising means for coupling said sensors and said active elements to said computer processor circuit for indicating an operational status thereof on said display, and for inhibiting generation of said threat scenario when at least one of said sensors or said active elements is in an operational status indicative of reception of said electromagnetic emissions or actuation of said active elements.

4,959,016

WEAPON TRAINING SYSTEMS

Ian R. Lawrence, 2 Main Avenue, Enfield, Middlesex, EN1 1DA, England

Filed Jun. 27, 1989, Ser. No. 371,766
Claims priority, application United Kingdom, Jun. 27, 1988, 8815226
Int. Cl.[5] F41G 1/00
U.S. Cl. 434—22 8 Claims



1. A weapon training system for simulating the use of a weapon against a target, the system comprising:

a source of electromagnetic radiation adapted to be secured to the weapon, said source being arranged to produce a narrow beam of radiation which is directed generally along the aiming line of the weapon;

means for scanning said beam in a predetermined direction transversely of said aiming line;

means for modulating the beam at a frequency which is a function of the angular position of said beam along said scan direction; and

detector means adapted to be secured to the target, for receiving the beam when the weapon is aimed at the target;

wherein the detector means has an entry aperture which is extended by a predetermined amount along the direction of scan of the beam;

and further comprising a circuit coupled to the output of the detector means and responsive to the respective modulation frequencies of the beam at the start and at the end of the illumination of the entry aperture of the detector means by the beam to compute the range from the weapon to the target.

4,959,017

ELECTRONIC LEARNING DEVICE FOR TEACHING HOW TO HANDLE MONEY

Barbara J. Thompson, Jesse Ursery, Jr., and William Holmes, Jr.; all of Knox County, Tenn., assignors to Tutor Toys, Inc., Knoxville, Tenn.

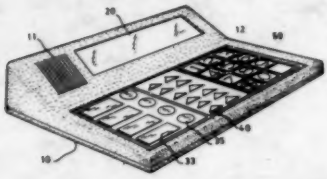
Filed Feb. 15, 1989, Ser. No. 311,124
Int. Cl.[5] G09B 19/18
U.S. Cl. 434—110 16 Claims

1. An electronic learning device for teaching monetary management skills involving currency and coins, comprising:

student input means for generating input codes representative of monetary values and of selected monetary management skills;

interrogation means responsive to said input codes generated by said student input means to request said student to engage in a selected money transaction problem, wherein each money transaction problem has a plurality of possible correct responses;

comparison means for receiving, and being responsive to, specific codes generated by said input means in response to said request to determine if said specific codes corresponds to one of a plurality of possible correct student responses to said money transaction problem; and



means connected to said interrogation means and said comparison means to communicate with said student said request and comment on the appropriateness of said response by said student to said money transaction problems.

4,959,018

ELECTRIC CONNECTION BOX

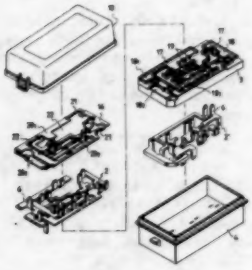
Masaki Yamamoto; Hisashi Sato, and Keiichi Ozaki, all of Kosai, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,595

Claims priority, application Japan, Jul. 15, 1988, 63-93070[U]

Int. Cl.[5] H01R *13/52*

U.S. Cl. 439—76 **4 Claims**



1. In an electric connection box of the type having at least one layer of bus bars disposed on an insulating base plate to form a circuit board, said circuit board being within said connection box; the improvement comprising:

means on said base plate defining grooves within which lie the bus bars of said at least one layer of bus bars;

said grooves having a pattern corresponding to the pattern of said bus bars of said at least one layer;

said means comprising walls surrounding said bus bars; and

waterproof elements individually covering said bus bars within said grooves.

4,959,019

ELECTRIC CONNECTION BOX

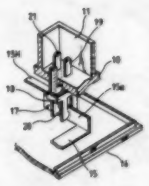
Eiji Shimochi, Shizuoka, Japan, assignor to Yazaki Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 358,227, May 30, 1989. This application Aug. 30, 1989, Ser. No. 400,628

Claims priority, application Japan, May 31, 1988, 63-131708; Aug. 30, 1988, 63-213792

Int. Cl.[5] H01R *9/09, 25/00*

U.S. Cl. 439—76 **4 Claims**



1. In an electric connection box of the type having a pair of upper and lower cases connected together to provide a casing, one of said upper and lower cases having an electrically insulating housing; a wiring assembly accommodated within said casing and including an electrically insulating plate and a plurality of bus bars mounted on said insulating plate; and external connection terminals electrically connected to said bus bars and having respective contact portions received within said insulating housing;

the improvement comprising, each of said external connection terminals including a base portion, a plurality of said contact portions formed integrally with said base portion and extending into said housing, and a bus bar-gripping portion formed integrally with said base portion press-fitted relative to said bus bar;

wherein said contact portions extend perpendicularly upward from the plane of said base portion at one end of said base portion, and said bus bar-gripping portion extends from the other end of said base portion; said bus bar-gripping portion including two sets of opposed holder sections for gripping said bus bar portion; each said holder section having two legs with a separation therebetween facing downward relative to said base portion; and each said holder section being joined to said other end of said base portion by a bent portion.

4,959,020

ELECTRICAL CONNECTOR SYSTEM FOR AUTOMATED STORAGE

Gaetano Di Rosa, Pino Torinese, Italy, assignor to Fata Automation S.p.A., Turin, Italy

Filed Jan. 31, 1989, Ser. No. 304,536

Claims priority, application Italy, Feb. 8, 1988, 19341 A/88

Int. Cl.[5] H01R *13/60*

U.S. Cl. 439—138 **7 Claims**

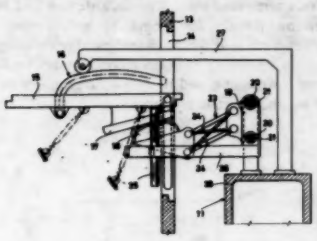
1. A storage system for self-refrigerated containers of the type in which the containers are housed in a cell of a cellular store, which system comprises:

(a) at least one self-refrigerated container having at least one first electrical contact means for connecting a refrigeration unit therein to an external electric power source;

(b) a corresponding cell for housing said container, said cell having a support member provided with at least one second electrical contact means for connecting said electric power source to said first electrical contact means and having guide means for supporting said container in said cell;

(c) said first and said second electrical contact means being positioned in said container and said cell, respectively, so

that when said container is inserted in said cell and rests on said guide means said electrical contact means mutually



engage for providing an electrical connection between the external electric power source and said refrigeration unit.

4,959,021

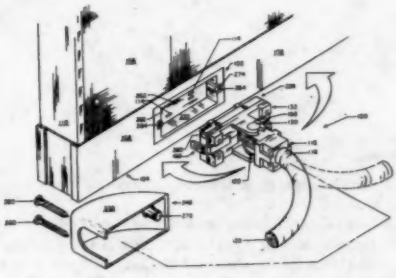
PIVOTABLE POWER FEED CONNECTOR

Norman R. Byrne, 2736 Honey Creek, NE., Ada, Mich. 49301

Continuation-in-part of Ser. No. 180,377, Apr. 12, 1988, abandoned, which is a continuation-in-part of Ser. No. 56,256, May 26, 1987, abandoned, which is a continuation of Ser. No. 826,198, Feb. 5, 1986, abandoned. This application Jul. 31, 1989, Ser. No. 388,696

Int. Cl.[5] H01R *35/00*

U.S. Cl. 439—310 **35 Claims**



1. A power feed assembly adapted to supply electrical power and/or ground voltages to an electrical receptacle means, said electrical receptacle means adapted to be located in or on a wall panel or support surface or the like, and connectable to various types of electrical apparatus or to other receptacle means, said power feed assembly comprising:

pivotal connector means adapted to be secured to a conduit or cable having at least one conductor capable of carrying electrical power or ground voltage prior to any electrical connection to said electrical receptacle means;

pivot block means pivotably connectable to said pivotal connector means for providing a pivot connection relative to said conduit or cable;

contact block means connectable to said pivot block means and having at least one prong terminal electrically connectable to said at least one conductor;

protective cover means adapted to be slidably secured to said contact block means for selectively covering said at least one prong terminal; and

means for selectively locking said pivotal connector means in a fixed position relative to said pivot block means.

4,959,022

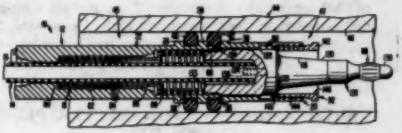
ELECTRICAL CONNECTOR FOR HIGH PRESSURE APPLICATIONS WITH RAPID PRESSURE TRANSIENTS

David H. Neuroth, Hamden, Conn., assignor to Hubbell Incorporated, Orange, Conn.

Filed Aug. 30, 1989, Ser. No. 400,684

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—589 **26 Claims**



1. An electrical cable connector, the combination comprising:

an electrical cable including an electrical conductor having a layer of elastomeric insulation thereon;

a hollow housing receiving a portion of said electrical cable therein and having an inner surface; and

means, located in said housing, for sealing the space between said inner surface of said housing and said electrical cable to prevent said conductor from being exposed to outside fluid,

said means for sealing comprising

an annular sealing element surrounding said electrical cable, having a generally U-shaped longitudinal cross section, and including first and second concentric leg portions extending generally axially in said housing, said first leg portion engaging and sealing against said inner surface of said housing and said second leg portion engaging and sealing against said elastomeric insulation of said electrical cable, and

positioning means, coupled to said housing, for axially restraining said sealing element with said housing.

4,959,023

ELECTRICAL CONNECTOR

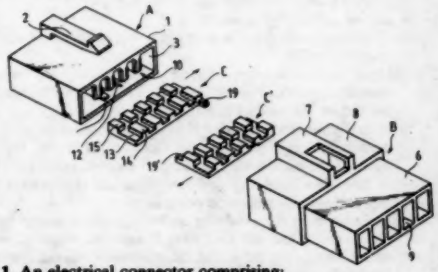
Hiroshi Watanabe, and Katsuaki Terada, both of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Aug. 3, 1989, Ser. No. 389,147

Claims priority, application Japan, Aug. 8, 1988, 63-196124

Int. Cl.[5] H01R *13/40*

U.S. Cl. 439—595 **9 Claims**



1. An electrical connector comprising:

an electrically-insulative housing having front and rear open ends and at least one terminal-receiving chamber, said housing having a slot therein adjacent to said front open end thereof;

at least one contact terminal inserted into said chamber from said rear open end of said housing; and

a spacer inserted into said slot in such a manner that said spacer can be slidingly moved perpendicularly to the axis of said contact terminal to a locked position, said spacer having a terminal-retaining portion which engages said

contact terminal when said spacer is in said locked position to thereby prevent said contact terminal from being withdrawn from said chamber, in which said spacer has a lock-confirming tongue at a front corner portion thereof, said lock-confirming tongue being adapted to be engaged with a spacer inserted into an open front end of a mating connector, the lock-confirming tongue being received in a space formed between the spacer of the mating connector and an inner wall of the mating connector, and when one of said spacer and the spacer of the mating connector is not disposed in their respective locked positions, the engagement between the two connectors being prevented.

4,959,024

SHIELDING DEVICE FOR ELECTRIC PLUG CONNECTORS

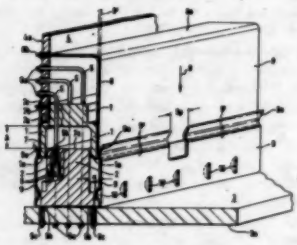
Franz Czeschka, Rechberghausen, Fed. Rep. of Germany, assignor to ERNI Elektroapparate GmbH, Adelberg, Fed. Rep. of Germany

Filed Oct. 5, 1989, Ser. No. 417,524

Claims priority, application Fed. Rep. of Germany, Oct. 7, 1988, 3834182

Int. Cl.[5] H01R *13/648*

U.S. Cl. 439—607 **12 Claims**



1. Shielded connector for connecting a first board to a second board, such as printed circuit boards, said shielded connector comprising;

a first connector housing;

said first connector housing for being installed on the first board:

said first connector housing including first electrical contacts therein which are for being electrically connected to the first board;

a second connector housing;

said second connector housing for being installed on the second board;

said second connector housing including second electric contacts therein which are for being electrically connected to the second board;

said first connector housing being for mating with said second connector housing for causing said first electric contacts to mate with said second electric contacts;

first means for shielding said first electrical connector housing and said first electric contacts therein:

said first means for shielding including a first shielding device at one side of said first connector housing and a second shielding device at the other side of said first connector housing;

said first shielding device and said second shielding device being respectively electrically connected to the first board;

a second means for shielding said second connector housing and said second electric contacts therein;

said second means for shielding including a third shielding device at one side of said second connector housing and a fourth shielding device at the other side of said second connector housing;

said third shielding device and said fourth shielding device being respectively electrically connected to the second board; and

said first shielding device for being in overlapping electrical contact with said third shielding device and said second shielding device for being in overlapping electrical contact with said fourth shielding device when said first connector housing and said second connector housing are mated for causing said first electric contacts to mate with said second electric contacts.

4,959,025

ELECTRICAL APPARATUS PLUG

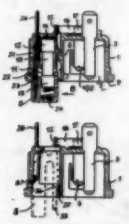
Walter Eberhard, Horgen, and André Simmler, Wäden swil, both of Switzerland, assignors to Feller AG, Horgen, Switzerland

Filed Aug. 28, 1989, Ser. No. 398,933

Claims priority, application Switzerland, Sep. 9, 1988, 386/88

Int. Cl.[5] H01R *33/95*

U.S. Cl. 439—622 **6 Claims**



1. An electrical apparatus plug connecting module comprising in combination:

a base of an insulating material and a plurality of contact terminal members anchored therein in a first compartment and intended for electrical coupling of a power line cable plug to said terminal members, and having a safety fuse holder in a separate compartment in the base adjacent to the first compartment into which a fuse carrier is insertable and from which the fuse carrier is withdrawable in a guided manner, and

a fuse carrier of an insulating material intended for holding two safety fuse cartridges when inserted into the separate compartment, said fuse carrier being shaped to project above an open top side of said first compartment and said separate compartment, said fuse carrier further being provided on a side facing said contact terminal members anchored in said first compartment with a manually operable operating lever extending above the open top side of said separate compartment, said operating lever providing a manually accessible yielding tongue integral with said fuse carrier and carrying a manually operable first detent member formed on said operating lever for cooperating with a second detent member formed on a partition wall between the separate compartment and the first compartment so that the yielding tongue is manually operable only if said plug is removed from said first compartment thereby to allow manual access to the operating lever for withdrawing of said fuse carrier out of said base after moving the detent members away from one another.

4,959,026

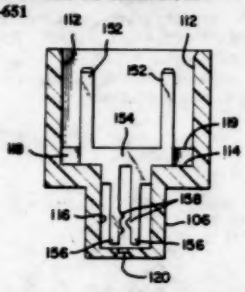
POWER DISTRIBUTION ADAPTER

Earl R. Kreinberg, Phoenix, Ariz., assignor to AMP Incorporated, Harrisburg, Pa.

Continuation of Ser. No. 235,391, Aug. 23, 1988, abandoned, which is a division of Ser. No. 65,239, Jun. 22, 1987, Pat. No. 4,790,760. This application Oct. 11, 1989, Ser. No. 423,541

Int. Cl.[5] H01R *25/00*

U.S. Cl. 439—651 4 Claims



1. An electrical adapter for distributing power to a plurality of devices mounted on a panel and at least electrically connected to respective arrays of electrical pins extending from the panel for electrical connection therewith by electrical power means, comprising:

an insulative housing having a cable face and an opposing panel face, said housing including a plug-receiving cavity along said cable face to receive thereinto plug portions of first and second connectors terminating first and second cable means; and

a plurality of electrical contacts secured in said housing extending between said cable face and said panel face thereof, each said contact having a commoning bar, a receptacle section extending forwardly from said commoning bar and adapted to be matable with a respective said pin and exposed along said panel face for electrical connection therewith, and a pair of post sections coextending in parallel rearwardly from said commoning bar and disposed within said plug-receiving cavity;

first and second ones of said post sections of said pairs of post sections being aligned in respective first and second rows within said plug-receiving cavity for electrical connection with respective corresponding contact sections of respective rows of terminal means terminated to respective first and second electrical cables and disposed within respective first and second housing means of said first and second cable connectors therefor,

whereby the adapter is pluggable to a pin array of the device and in turn defines two like post arrays similar to said device pin array by said first and second post sections in said plug-receiving cavity to receive thereinto plug portions of both first and second housings side-by-side into a common end so that the first cable can transmit power into the assembly by a connector otherwise matable with said device pin array, and the assembly can both distribute power to the device and transmit power to the second cable for distribution to other devices.

4,959,027

FUEL INJECTOR ADAPTOR

Steven Z. Muzslay, Huntington Beach, Calif., assignor to ITT Corporation, New York, N.Y.

Filed Feb. 20, 1990, Ser. No. 481,409

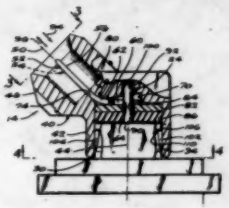
Int. Cl.[5] H01R *25/00*

U.S. Cl. 439—655 11 Claims

1. A fuel injector adaptor for coupling the electrical terminals of a straight fuel injector to a connector that extends at an incline, comprising:

an adaptor housing which has a lower part that opens downwardly along a first axis and an upper part that opens at an upward incline along a second axis;

a pair of plate-like contacts each having an upper contact part lying in said upper housing part and extending substantially parallel to said second axis, and having a lower



contact part lying in said lower housing part and extending substantially perpendicular to said first axis, each lower contact part having walls forming a hole for receiving a fuel injector terminal, and each contact having a bent middle part.

4,959,028

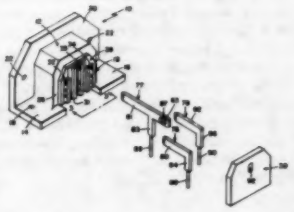
ELECTRICAL POWER CONNECTOR

Antonio A. Garay, Roselle; Tedford H. Spaulding, Chicago, and Robert L. Valleau, Des Plaines, all of Ill., assignors to Switchcraft Inc., Chicago, Ill.

Filed Apr. 12, 1989, Ser. No. 336,488

Int. Cl.[5] H01R *13/41*

U.S. Cl. 439—733 12 Claims



1. An electrical connector comprising:

a dielectric body including a housing having therein a cavity and having a wall defining a peripheral portion of said cavity, said wall having respective first pluralities of surface portions defining respective first opening means extended through said wall and into communication with said cavity for permitting passage of respective first portions of respective contact members through said wall and into said cavity, each of said respective first pluralities of surface portions including a respective first surface portion of said wall having a respective first integral projection extended into said respective first opening means; and

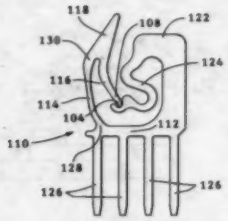
said wall having an outer surface with respective second pluralities of surface portions defining respective second opening means in said outer surface for receiving therein respective second portions of said respective contact members, each of said respective second pluralities of surface portions including respective second surface portion of said wall having an integral projection extended into said respective second opening means.

4,959,029

ELECTRICAL CONTACT

Dimitry G. Grabbe, Middletown, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Aug. 18, 1989, Ser. No. 395,621
Int. Cl.[5] H01R 4/48
U.S. Cl. 439—862 **11 Claims**



1. An electrical contact (110) for providing an electrical path between a first contact portion (130) and a second contact portion (126) and providing a contact force at said first contact portion (130), characterized by:

a base (112) having said second contact portion (126) projecting therefrom;

a first beam (114) having first and second ends and said first contact portion (130), said first beam first end being attached to said base;

a second beam (116) having first and second ends, said second beam first end being attached to said first beam second end, said second beam second end extending toward said base (112);

a third beam (124) having first and second ends, said third beam first end arranged for pivoting movement with respect to said second beam second end, said third beam second end attached to said base; and

spring means (124, 114, 116, 118) for resiliently coupling said first contact portion (130) to said base (112);

said first and second beams being configured to convert contact induced movement of said first contact portion in a first direction to movement of said second beam second end in a second direction transverse to said first direction, said spring means applying a resisting force to said second beam second end in a third direction opposite said second direction, the extent of said movement of said second beam second end being substantially less than the extent of said contact induced movement so that said spring means remains within its elastic limit.

4,959,030

ELECTRICAL CONNECTOR FOR CONNECTING TWO FLAT CABLES TO A CIRCUIT BOARD

Yu Tatebe; Hiroshi Yasui; Yukio Matsuyama, and Hiroji Takahashi, all of Tokyo, Japan, assignors to Japan Aviation Electronics Industry, Limited and NEC Corporation, both of, Japan

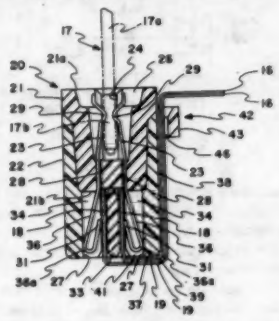
Continuation of Ser. No. 233,206, Aug. 17, 1988, abandoned. This application Feb. 28, 1990, Ser. No. 488,400
Claims priority, application Japan, Aug. 19, 1987, 62-125116[U]; Aug. 19, 1987, 62-125117[U]; Sep. 4, 1987, 62-134645[U]
Int. Cl.[5] H01R 9/07, 9/09
U.S. Cl. 439—67 **13 Claims**

1. An electrical connector for connecting first and second flat cables to a circuit board having front side conductors and rear side conductors, each of said first and said second flat cables having a cable end and a remaining portion extended from said cable end, said connector comprising:

an insulator housing with a specific outer surface;

first and second groups of contact members held in said insulator housing and arranged in first and second spaced parallel contact rows, with a space between said first and said second rows for receiving said circuit board therein to make electrical connections between said first and said second contact member groups and said front and said rear side conductors, said contact members of said first and said second groups having terminal portions for electrically and mechanically making connections with said cable ends of said first and said second flat cables, respectively, said remaining portion of each of said first and said second flat cables having a particular portion outside of said insulator housing;

restriction means for restricting said particular portion to extend along said specific outer surface;



mechanical coupling means for coupling said restriction means to said insulator housing, said restriction means being opposite to said specific outer surface with a single gap left between said restriction means and said specific outer surface, said single gap enabling said cable to extend therethrough in order to make said particular portion extend along said specific outer surface; and

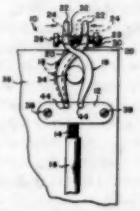
fastening means made of insulation and coupled to said insulator housing between said first and second terminal portions for tightly pressing said cable ends against said first and said second terminal portions.

4,959,031

EASILY REMOVEABLE BATTERY TERMINAL

Arthur Ruiz, 1701 Newport Rd., Croydon, Pa. 19020, and George Spector, 233 Broadway, New York, N.Y. 10007

Filed Feb. 23, 1990, Ser. No. 484,061
Int. Cl.[5] H01R 4/48, 4/42
U.S. Cl. 439—759 **4 Claims**



1. A battery terminal post clamp comprising:

(a) a pair of mounting plates;

(b) means for attaching said mounting plates together so that an electrical conductor of a battery cable can fit and be gripped between said mounting plates;

(c) a pair of inwardly curved arms having crossed end portions;

(d) means for pivotly connecting each said arm at its lower end on one said mounting plate in a spaced apart relationship to other said arm;

(e) a pair of finger engaging portions, each having an aper-

ture therethrough and affixed to one said crossed end portion of one said arm;

(f) a guide bolt having a threaded shank extending through each aperture in each said finger engaging portion;

(g) a guide nut threaded onto end of said shank of said guide bolt for holding said guide bolt thereon; and

(h) a coil compression spring arranged on said shank of said guide bolt between said finger engaging portions so as to urge said finger engaging portions apart causing said arms to move towards each other to grip a terminal post on a battery until a person squeezes said finger engaging portions together to compress said spring and thereby disengage said arms from the terminal post.

4,959,032

WATER CRAFT WITH GUIDE FINS

Hans Langenberg, and Jürgen Wessel, both of Hamburg, Fed. Rep. of Germany, assignors to Blohm + Voss AG, Hamburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 121,312, Nov. 16, 1987, Pat. No. 4,843,989. This application Sep. 8, 1988, Ser. No. 241,974

Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730008

Int. Cl.[5] B63H *5/16*

U.S. Cl. 440—66 **6 Claims**

CROSS SECTION B-B

1. A hull for a water vessel, said hull comprising:

an elongated displacement body, said elongated displacement body having a bow extremity and a stern extremity, said elongated displacement body having a major longitudinal and normally horizontal axis and a transverse and normally perpendicular axis, the length of said elongated displacement body along said major longitudinal axis being substantially equal to L;

propeller means for propelling said elongated displacement body through water, said propeller means being disposed near said stern extremity of said elongated displacement body; and

at least one guide vane provided on said elongated displacement body;

said at least one guide vane being located at a distance between about ¼L and about ½ L from said propeller means towards said bow extremity; and

said at least one guide vane comprising means for optimizing the flow of water to said propeller means;

wherein said elongated displacement body comprises a tunnel hull having at least one inwardly concave depression formed therein and extending forward from said propeller means, and wherein said at least one guide vane is disposed so as to bridge across said at least one inwardly concave depression.

4,959,033

MARINE PROPULSION DEVICE COVER ARRANGEMENT

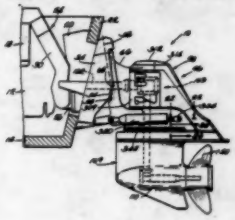
Gerald F. Bland, Glenview, Ill.; Michael W. Freitag, Kenosha, Wis., and Martin J. Mondek, Wonder Lake, Ill., assignors to Outboard Marine Corporation, Waukegan, Ill.

Filed May 12, 1989, Ser. No. 351,865

Int. Cl.[5] B63H *21/14*

U.S. Cl. 440—76 **13 Claims**

1. A stern drive unit comprising a metal upper gear housing which is adapted to be mounted on the transom of a boat for pivotal movement relative thereto about a generally vertical steering axis and about a generally horizontal pivot axis, and which includes a rear portion, a generally vertical drive shaft rotatably supported by said upper gear housing and adapted to be driven by an engine, a lower gear housing fixed to said upper gear housing for common movement therewith, a propeller shaft which is rotatably supported by said lower gear housing, which is driven by said vertical drive shaft, and which



is adapted to have mounted thereon a propeller, and plastic cover means which covers more than a majority of said upper gear housing and which includes first and second plastic cover members respectively covering said first and second side portions of said upper gear housing, and a third plastic cover member covering said rear portion of said upper gear housing.

4,959,034

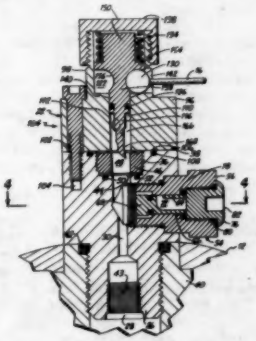
PUNCTURE DISC INFLATION VALVE WITH IMPROVED CUTTING BAYONET

Lloyd G. Wass, 1670 Blackhawk Cove, Eagan, Minn. 55122

Filed Oct. 25, 1988, Ser. No. 262,273

Int. Cl.[5] B63B *35/58*

U.S. Cl. 441—41 **10 Claims**



1. For use in a puncture disc inflation valve, a bayonet for puncturing a puncture disc, the bayonet comprising:

a cutting head having a back face formed in the shape of a cone with a central axis;

a planar cutting face disposed across a widening end of the cutting head and intersecting the central axis at between a 40° and a 50° angle for forming a cutting edge between the cutting face and the back face;

a lead point of the cutting edge where the intersection between the cutting face and the back face is furthest removed from the central axis;

a relief portion in the back face in the cutting head opposite the lead point; and

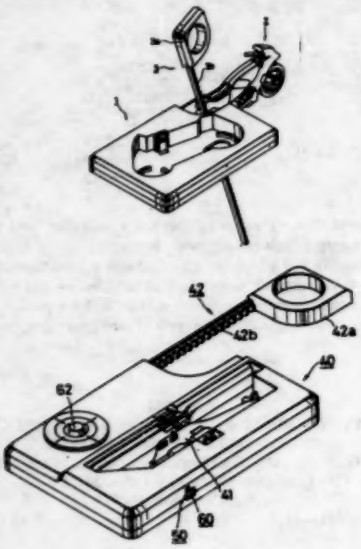
a terminating edge between the cutting face and the relief portion forming end points to the cutting edge.

4,959,035

MINIATURE STORAGE CONTAINER FOR A MANUALLY PROPELLED TOY MEMBER

Keiichi Muranaki, Tokyo, Japan, assignor to Sega Enterprises, Ltd., Tokyo, Japan

Filed Nov. 4, 1988, Ser. No. 267,036
Claims priority, application Japan, Mar. 10, 1988, 63-31988
Int. Cl.[5] A63H *1/04, 17/21, 27/133, 29/00*
U.S. Cl. 446—40 **11 Claims**



1. An improved storage container for a manually propelled toy member comprising:

a thin flat housing member configured to be of a size approximating the user's hand, the housing member having a cavity for retainably storing the toy member, and

means in the housing member, at a position apart from the cavity, for transmitting a propulsion force to the toy member including a removable flexible power rack.

4,959,036

DOLL ASSEMBLED OF PREFABRICATED WEAVE SECTIONS OF RUSH STALKS

Chang-Am Koh, Room No. 1107, 27-dong, Woosung Apt. 101-2, Jamsil-dong, Kangdong-ku, Seoul, Rep. of Korea

Filed Feb. 29, 1984, Ser. No. 584,919
Claims priority, application Rep. of Korea, Apr. 16, 1983, 3429/83; Jul. 15, 1983, 6312/83; Sep. 26, 1983, 8344/83
Int. Cl.[5] A63H *3/36*
U.S. Cl. 446—385 **18 Claims**

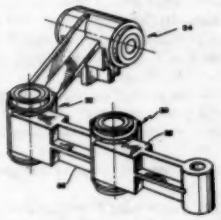
1. An assembled rush stalk doll comprising a doll body having a shoulder portion or an upper portion formed of woven warp rush stalk threads and weft rush stalk threads, both the warp and weft rush stalk threads having extended strands, some of the strands formed into arms and other of the strands formed into other body portions in a desired shape, and a separate head section being fitted to the top of the doll body.

4,959,037

WRITING DOLL

Henry Garfinkel, 31 Dogwood Rd., Searingtown, N.Y. 11507

Filed Feb. 9, 1989, Ser. No. 308,020
Int. Cl.[5] A63H *3/28, 33/24, 3/33;* **B43L** *13/00*
U.S. Cl. 446—299 **16 Claims**



1. A writing doll having portions defining a head and appendages comprising:

at least one apppendage having a portion adapted to hold a writing stylus;

a first motion control means mounted in said at least one appendage near said stylus holding portion for moving said stylus holding portion along a generally planar writing surface in an arcuate direction;

a second motion control means for oscillating said stylus holding portion about a horizontal axis for at least lifting said stylus holding portion out of writing engagement with said generally planar writing surface;

a third motion control means mounted in said at least one appendage between said first and said second motion control means for moving said first motion control means and said stylus holding portion along said generally planar writing surface in a second arcuate direction; and

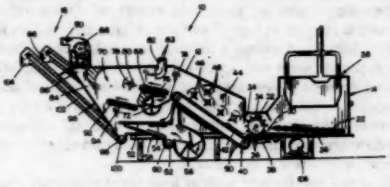
means responsive to electronically stored data for providing control signals for operation of each said motion control means.

4,959,038

MILKWEED PROCESSING MACHINE

George Ragsdale, Ogallala, Nebr., assignor to Natural Fibers Corp., Ogallala, Nebr.

Filed Jun. 30, 1989, Ser. No. 373,889
Int. Cl.[5] A01F 11/00, 12/385, 12/48
U.S. Cl. 460—149 3 Claims



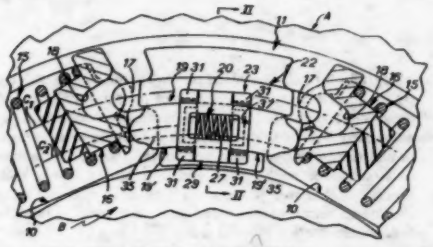
1. A method for removing floss from milkweed pods, comprising the steps of:
providing a milkweed pod processing machine having a housing with an inlet and an outlet;
introducing a plurality of milkweed pods into said housing inlet;
conveying said pods to a cracking chamber;
cracking open said pods to expose the floss therein;
conveying said cracked pods to a picking chamber;
picking milkweed floss from said pods; and
forcing air over said picked pods to carry said floss to said housing outlet.

4,959,039

TORSION DAMPING DEVICE, IN PARTICULAR FOR A FLYWHEEL TYPE TRANSMISSION OF AN AUTOMOTIVE VEHICLE

Jacky Naudin, Ermont, France, assignor to Valeo, Paris, France

Filed Dec. 15, 1989, Ser. No. 451,181
Claims priority, application France, Dec. 28, 1988, 88 17339
Int. Cl.[5] F16D 3/14; F16F 15/12
U.S. Cl. 464—66 9 Claims



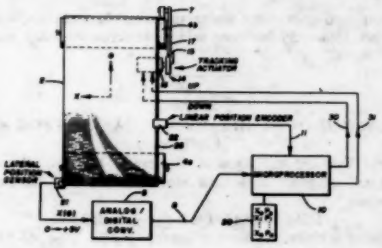
1. A torsion damping device comprising two coaxial parts, means mounting said coaxial parts for relative rotation with respect to each other, and means defining a predetermined range of angular displacement whereby to limit the extent of said relative rotation, one of said coaxial parts having a plurality of through openings formed therein and the other of the said coaxial parts having arms, the device further including a plurality of main resilient members each of which is disposed in a respective one of the said through openings in said one coaxial part whereby to engage with the said arms either directly or indirectly, the device further including centering means associated with at least one of the said arms, wherein the said centering means include a spacer member, extending circumferentially between two consecutive ones of said through openings of said one coaxial part, and a resilient centering member arranged between the said spacer member and the appropriate said arm, the said spacer member being divided into two centering fingers separate from each other, with one centering finger corresponding to each of the associated said through openings, and with the resilient centering member extending from one of the said centering fingers to the other.

4,959,040

METHOD AND APPARATUS FOR PRECISELY POSITIONING AND STABILIZING A CONTINUOUS BELT OR WEB OR THE LIKE

Deane Gardner, Cupertino, and George Fellingham, San Jose, both of Calif., assignors to Rastergraphics Inc., Sunnyvale, Calif.

Filed Apr. 21, 1989, Ser. No. 341,799
Int. Cl.[5] F16H 7/18
U.S. Cl. 474—103 12 Claims



1. An apparatus for improved tracking and control of a traveling belt or web or the like supported and driven by at least one roller means comprising:
means for establishing a reference array of belt positions relative to a position fixed with respect to an ideal axis of travel for said belt at precise positional intervals along the entire length of said belt;
control means for sensing at each positional interval the displacement of said belt from said ideal axis of travel and for providing a corrective feedback signal representative of the displacement difference between said sensed position and a corresponding element of said reference array;
tracking actuator means responsive to said corrective feedback signal for moving the angle of said roller to thereby maintain said belt in a substantially invariant position with respect to its ideal axis of travel.

4,959,041

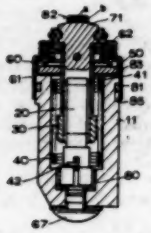
TENSIONER FOR A CHAIN, A BELT OR THE LIKE

Juji Ojima, Aikawa; Kazuo Ishii, and Fumio Numakura, both of Miyata, all of Japan, assignors to NHK Spring Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 268,918, Nov. 9, 1988. This application Sep. 27, 1989, Ser. No. 413,093
Claims priority, application Japan, Nov. 9, 1987, 62-282648; Aug. 31, 1988, 63-216794; Aug. 31, 1988, 63-216796; Aug. 31, 1988, 63-216797; Aug. 31, 1988, 63-216798
Int. Cl.[5] F16H 7/08
U.S. Cl. 474—111 6 Claims

1. A tensioner for a chain, or a belt comprising:
a casing,
a male screw member and a female screw member installed within the casing in a screwed state,
a spring which provides a rotation force to said male screw member,
a bearing into which the female screw member is inserted so that the female screw member may advance in an axial

direction by rotation of the male screw member while constraining the rotation of said female member, and



a supporting member which supports the male screw member rotatively between said male screw member and the casing.

4,959,042

LAYOUT OF AUXILIARY MECHANISMS FOR AN ENGINE

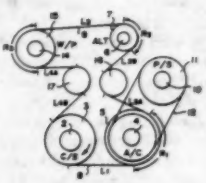
Hideki Tanaka, and Kyoichi Umemura, both of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed May 12, 1989, Ser. No. 350,992

Claims priority, application Japan, May 13, 1988, 63-116402; May 13, 1988, 63-116403

Int. Cl.[5] F16H *7/12*

U.S. Cl. 474—134 **24 Claims**



1. A layout of auxiliary mechanisms for an engine which are driven by a first auxiliary mechanism driving belt passed around a crankshaft pulley integrally mounted on the crankshaft of the engine and auxiliary mechanism pulleys integrally provided on the respective auxiliary mechanisms, characterized in that the auxiliary mechanisms are arranged in the order of rotational inertia force so that the rotational inertia force of the auxiliary mechanism nearest to the crankshaft pulley as seen toward the tight side of the first auxiliary mechanism driving belt from the crankshaft pulley is the largest.

4,959,043

MULTI-PINION DIFFERENTIAL ASSEMBLY

James R. Klotz, Mt. Clemens; Steven A. Mikel, Farmington Hills; John A. Frait, Walled Lake, and Berthold Martin, Utica, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

Filed Aug. 29, 1989, Ser. No. 400,203

Int. Cl.[5] F16H *1/38*

U.S. Cl. 475—230 **2 Claims**

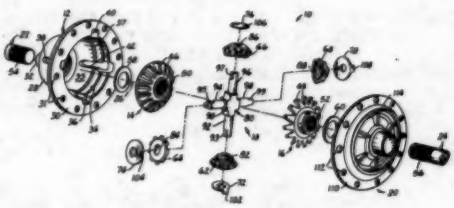
1. A differential gear assembly comprising:

a pair of axially aligned axle shafts with their adjacent inner end portions extending into a hollow casing which is rotated about a longitudinal axis aligned with the shaft axis:

said casing having a bell-shaped hub formed with a base at its lower end and an axially opposite enlarged upper exterior open end having a predetermined internal diameter concentrically disposed about said longitudinal axis, said upper open end defined by a peripheral radial flange, said casing hub defining an internal surface formed with a central internal surface portion thereof having a substantially uninterrupted spherical curvature symmetrically disposed about said longitudinal axis, said central internal spherical surface portion having its center of curvature on said longitudinal axis so as to be defined by a radius of curvature radiating from said center of curvature, said central internal spherical surface portion defining an interior hub lip forming a central internal access opening concentric with and spaced an axial axis distance below said exterior upper open end, said central internal access opening positioned a predetermined distance above said center of curvature and having an internal diameter a predetermined dimension smaller than said exterior upper open end internal diameter;

said casing hub formed with at least three uniformly spaced elongated through slots having an upper open end and a closed lower end, each said slot having its open upper end in said radial flange and extending vertically downwardly a predetermined axial extend such that each said slot closed lower end terminates in said central internal surface portion intermediate said center of curvature and said casing bell-shaped hub base;

a pair of upper and lower bevel side gears adapted to be positioned in spaced opposed relationship within said casing hub and symmetrically disposed with respect to a horizontal plane that includes said central internal spherical surface portion center of curvature, such that said upper and lower bevel side gears are rotatable about said longitudinal axis;



an integrally formed one-piece pinion spider having at least three uniformly spaced stub pins of predetermined radial dimension, each said stub pin vertically located in an associated one of said slots with its principal axis positioned substantially in said horizontal plane intermediate each said slot upper open end and closed lower end, whereby oil is free to flow through each said slot both above and below its associated stub pin providing lubrication to the interior of said casing;

at least three symmetrically spaced bevel pinion gears with each pinion gear slidably positioned on an associated stub pin of said spider to a predetermined radially innermost initial pinion gear assembly position contacting an inner stop shoulder on its associated stub pin, and with each said spider stump pin inserted in an associated axial slot upper open end enabling said pinion gears to pass vertically downwardly through said interior hub lip central internal access opening after fitting through said casing upper open end;

and thereafter each said pinion gear subsequently sliding radially outwardly from its stop shoulder in a gravity induced manner on its associated stub pin a predetermined distance so as to assume an axially floating working position, wherein each said pinion gear is in meshing engagement with said pair of opposed upper and lower bevel side gears such that said pinion gears are free to seek their own backlash therewith; and end cover plate having a peripheral flange, means securing said peripheral flange to said casing upper open end radial flange and cooperating

therewith to retain said bevel side gears, said bevel pinion gears and said cross-shaft spider in assembled relationship with said casing hub; and

concave bearing washers positioned between each said pinion gear and said hub central spherical surface portion, each said washer outer periphery formed with a radially outwardly extending positioning tab of predetermined radial length so as to be received in the upper open end of an associated axial slot during initial installation of said spider and pinion gears, each said tab being trapped against disengagement from its associated axial slot with said pinon gears in their working position thereby preventing relative rotation between each said washer and said casing hub central spherical portion.

4,959,044

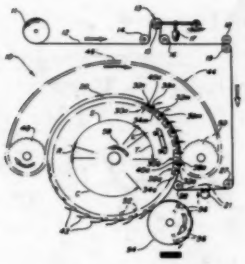
FILM TENSION COMPENSATION DEVICE FOR BAG MAKING MACHINE

David A. Smith, Midland; Herbert B. Geiger, Bay City, and R. Douglas Behr, Midland, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 188,884, May 2, 1988, Pat. No. 4,902,374. This application Apr. 7, 1989, Ser. No. 334,412

Int. Cl.[5] B23B *23/10, 23/16*

U.S. Cl. 493—194 **23 Claims**



1. An apparatus for the continuous production of bags of differing widths from a folded web of thermoplastic material comprising:

a rotatable drum having a plurality of sever and seal stations located about the outer periphery thereof for forming individual bags;

a source of a continuous folded web of thermoplastic material;

means for continuously feeding said folded web of thermoplastic material onto the surface of said drum and past said sever and seal stations;

means for tucking said web of material inwardly or outwardly from said outer periphery of said drum; and

film tension compensation means for maintaining a constant length of travel for said web of material between said source and said sever and seal stations, said film tension compensation means including displacing means located between said web source and said drum for deflecting said web of material to cause a periodic change in the path length of said web, and means in combination with said displacing means for moving said displacing means in synchronous relationship with said tucking means to maintain a constant net length of travel for said web between said source and the point at which said web is severed, whereby a substantially constant tension is maintained on said web.

4,959,045

FILTER SOCKS

Philip J. Hartley, 24 Ardoyne House, Pembroke Park, Ballsbridge, Dublin 4, Ireland, and James Walshe, 120 The Coppice, Woodfarm Acres, Palmerston, Dublin, Ireland

Continuation of Ser. No. 809,943, Dec. 17, 1985, abandoned. This application Dec. 19, 1988, Ser. No. 286,314

Claims priority, application Ireland, Dec. 21, 1984, 3339/84

Int. Cl.[5] B01D *27/06;* **B31D** *5/04*

U.S. Cl. 493—254 **4 Claims**

1. A method of making a filter sock which comprises cutting a panel member having opposite substantially parallel free edges, doubling the panel member over along a line substantially parallel to the said free edges to form a panel with two leaves of which a first leaf is wider than a second leaf, folding the free edge of the first leaf around the free edge of the second leaf such that said panel exhibits substantially constant width along its length, stitching all together the free edges of each of the leaves and that portion of the second leaf on the side opposite to its folded over free edge to form a tube having an axis substantially parallel to said stitched free edges and an open mouth at each end, closing one mouth of the tube by folding each of the leaves along a traverse fold line in the direction of the second open mouth of the tube thereby forming a hem and securing the hem to the leaves by stitching.

4,959,046

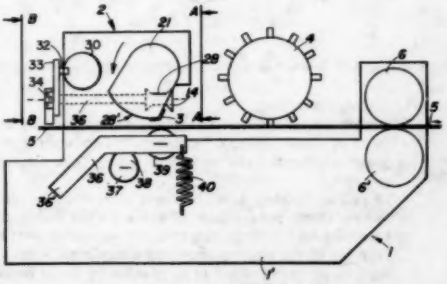
APPARATUS FOR FEEDING ADHESIVE COATED STITCHES TO CONTINUOUS FORMS FOR BINDING THE FORMS

Lari Brunetto, and Lucinso Mercatali, both of Florence, Italy, assignors to Officina Meccanica Giuseppe Conti, Florence, Italy

Filed Jun. 24, 1988, Ser. No. 211,429

Int. Cl.[5] B65H *35/00, 35/07*

U.S. Cl. 493—382 **2 Claims**



1. An apparatus for feeding separate strips of adhesive tape for binders of continuous perforated forms for tabulating machines, comprising: sprocket wheel means for inserting the leading end of a cut adhesive tape strip into a selected hole of the perforations provided at a margin of the continuous perforated forms and a means for fixing the leading end of each cut

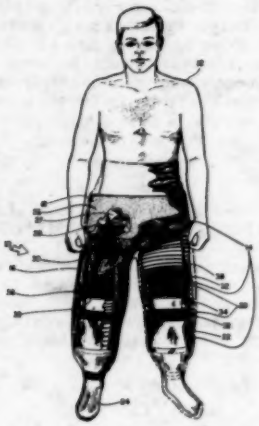
adhesive tape strip under the continuous perforated forms; a pair of overhanging rolls, each overhanging roll having a horizontal axis substantially parallel to an advancement direction of the forms, said overhanging rolls driving the adhesive tape; ratchet means having a cam element connected to said overhanging rolls to drive said overhanging rolls with intermittent advancement; cutting head means, vertically rotating over the path of feed of said forms, said cutting head means having at leasf one eccentric cutting edge and a concentric back portion to cut the adhesive tape, said cutting head means cutting a strip of adhesive tape and then positioning the cut adhesive tape strip above said continuous forms facing said cutting head means; rubber-coated counter-pressure roll means movable for lifting the continuous forms and for contacting and engaging the trailing end of the cut adhesive tape strip with the lifted form, said ratchet means driving said head in synchronism with the advancement of the forms to be bound and in synchronism with the advancement of the adhesive tape; and, means to cause the lifting of the counter-pressure roll in synchronism with the rotation of said cutting head means.

4,959,047

FLEXIBLE LOWER BODY NEGATIVE PRESSURE TROUSERS FOR $-G_z$ ACCELERATION PROTECTION

Lloyd D. Tripp, Jr., Dayton, Ohio, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Apr. 10, 1989, Ser. No. 335,621
Int. Cl.[5] A61H *31/00, 7/00*
U.S. Cl. 600—19 **9 Claims**



1. An anti-G suit for wear by an aircrew member, comprising:

(a) a frame, comprising:

(i) a rigid abdominal frame section, having generally the shape of a pair of briefs, for generally surrounding in a space relationship the abdominal area of the aircrew member;

(ii) a pair of mid-leg frame sections, each mid-leg frame section comprising a pair of spaced rigid bands for generally surrounding in a spaced relationship part of each leg of the aircrew member, wherein each pair of rigid bands are attached to each other by hinge means for providing flexibility at the knee of the aircrew member; and,

(iii) a pair of generally cylindrical rigid calf frame sections, each calf frame section for generally surrounding in a spaced relationship a calf of the aircrew member;

(b) a pair of gas impermeable boots for covering each foot of the aircrew member;

(c) a gas impermeable fabric covering the frame to form generally the shape of a pair of trousers;

(d) gas permeable pad means, covering generally the inside of the rigid abdominal frame section and extending for a distance down through the inside of the anti-G suit, for providing comfort and for allowing a generally free flow of gas between the aircrew member and the inside of the anti-G suit;

(e) means for sealing the portion of the gas impermeable fabric extending above the abdominal frame to the body of the aircrew member to form a substantially gas impermeable seal;

(f) means for sealing the portion of the gas impermeable fabric extending below the calf frames to the boots to form a substantially gas impermeable seal; and,

(g) connecting means for operatively interconnecting the inside of the anti-G suit to a source of negative pressure.

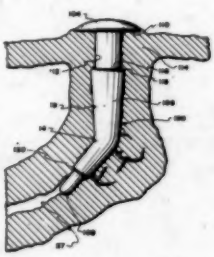
6. A method for protecting an aircrew member from the adverse effects of negative G_z acceleration, comprising the step of, in an aircraft undergoing negative G_z acceleration, applying a negative pressure to the lower body of the aircrew member.

4,959,048

LACRIMAL DUCT OCCLUDER

Edmund V. Soder, Santa Barbara, and William F. Sardi, Monrovia, both of Calif., assignors to Helix Medical, Inc., Santa Barbara, Calif.

Filed Jan. 17, 1989, Ser. No. 297,564
Int. Cl.[5] A61M *5/00*
U.S. Cl. 604—9 **17 Claims**



1. A reversible, flexible lacrimal duct occluder adapted to enter the punctum opening and block a canalicular canal having a vertical canaliculus connected to a horizontal canaliculus comprising in combination

a low profile cap having a width larger than the punctum opening;

a shaft having distal end and a proximal end connected to the cap;

a rounded tip connected to the distal end of the shaft; and

at least one rearwardly tapered conical ramp section mounted on said shaft between said ends and the diameter of the ramp being sufficient to block said canal and the distance between said ends being greater than the length of the vertical canaliculus such that the shaft bends and enters the horizontal canaliculus.

4,959,049

TIP FOR A PHACOEMULSIFICATION NEEDLE

Heinz J. Smirmaul, 1307 Brookstone Ln., Duncanville, Tex. 75137

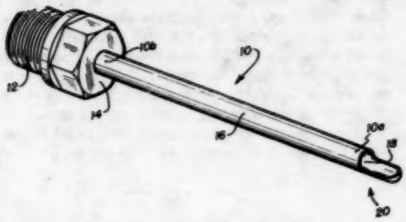
Filed Sep. 11, 1989, Ser. No. 405,525
Int. Cl.[5] A61B *17/20*
U.S. Cl. 604—22 **3 Claims**

1. In a phacoemulsification needle with a proximal end attachable to a phacoemulsification device and a distal end insertable into material to be emulsified; the needle having a

central longitudinal axis extending from the proximal end to the distal end; the phacoemulsification device oscillating the needle in the direction of the central longitudinal axis; a bore within the needle concentric to the central longitudinal axis thereof, thereby forming a lumen, the lumen having needle sidewalls therearound, having inner and outer surfaces with an opening at the proximal and distal ends of the needle, an improved tip comprising:

a tip formed by the distal opening which when viewed from an angle perpendicular to the central longitudinal axis has a side view comprising:

a top wall located at a needle sidewall on one side of the central longitudinal axis and terminating in a top wall end face disposed in a plane generally perpendicular to the central longitudinal axis, said top wall end face including a cutting surface for cutting the material to be emulsified in the direction of needle oscillation;



a bottom wall located at a needle sidewall on the opposite side of the central longitudinal axis and extending distal of said top wall end face to form a tip projection;

an end wall disposed generally perpendicular to said tip projection and disposed in a plane generally parallel to the plane of said top wall end face;

an arcuate portion interconnecting said tip projection and said end wall; and

a tip projection sidewall extending from the needle sidewall to said end wall and from said tip projection to the height of said end wall and terminating in a tip projection sidewall face, said tip projection sidewall face being generally parallel to said top projection and generally perpendicular to said top wall end face and further including a cutting surface for cutting the material to be emulsified in a direction generally perpendicular to the cuts made by said top wall end face as the needle is moved generally perpendicular to the direction of needle oscillation through the material to be emulsified.

4,959,050

IN-LINE INFILTRATION DETECTION APPARATUS AND METHOD

Donald E. Bobo, Jr., Orange, Calif., assignor to Baxter International Inc., Deerfield, Ill.

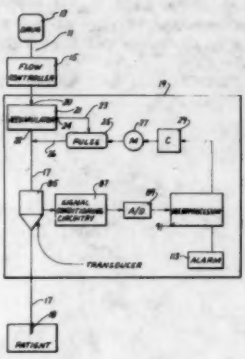
Filed Sep. 26, 1988, Ser. No. 249,065
Int. Cl.[5] A61M 5/00
U.S. Cl. 604—49 **53 Claims**

1. An apparatus for detecting whether a fluid is being properly supplied to a patient through conduit means by a flow controller which is located upstream from the detection apparatus and which infuses fluid in a normal delivery pattern at any of a plurality of selected infusion rates through conduit means to the patient, comprising:

(*a*) means for diverting and accumulating a predetermined volume of the upstream flow from the flow controller for use as a test pulse;

(*b*) means for delivering the test pulse of the fluid through the conduit means to the patient with the test pulse being distinguishable from the normal delivery pattern and with the test pulse creating a pressure wave response in the conduit means;

(*c*) means for determining the area between a baseline and at least a portion of a pressure versus time curve representing the pressure wave response; and



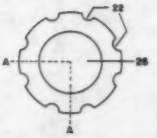
(*d*) means responsive to the magnitude of said area for detecting if the fluid is being improperly supplied by the conduit means to the patient.

4,959,051

DUAL CHAMBERED ORAL DOSAGE DELIVERY CONTAINER

Richard A. Glass, Richmond, Va.; Robert F. Ryer, II, Red Lion, and Deborah T. Tomcanin, Harrisburg, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed Oct. 13, 1989, Ser. No. 421,038
Int. Cl.[5] A61J 7/00
U.S. Cl. 604—77 **12 Claims**



1. A dual chambered container for delivery of a liquid medicament comprising a hollow, bottom chamber provided with an orifice on its upper surface, said bottom chamber being partially, externally threaded on the orifice side and cooperatively connected thereby to matching, internally disposed female threads of a retaining ring through which retaining ring a sealed, resilient teat is centrally disposed and secured by is base flange which is sealed between said bottom chamber and said retaining ring to form a second chamber in said teat, said chambers being separated by a stopper, and said being provided with (1) a removable, outwardly projecting tip, which when removed opens the nipple orifice through which said liquid medicament discharge is regulated, and (2) an enlarged, internal lower region extending to the open externally flanged base.

4,959,052

APPLICATOR FOR DISPENSING ACTIVE SUBSTANCES

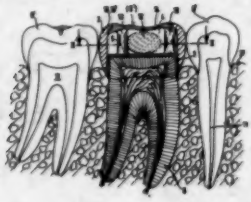
Kirsten Cox, Brügge, Fed. Rep. of Germany, assignor to Georg Wiegner, Viersen II, Fed. Rep. of Germany

Continuation of Ser. No. 3,120, Jan. 14, 1987, abandoned. This application Apr. 24, 1989, Ser. No. 342,645

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1986, 3601787

Int. Cl.[5] A61J 7/00; A61G 17/02

U.S. Cl. 604—77 24 Claims



1. An oral applicator for the application of an active substance to a user having an oral cavity comprising: a hollow structure corresponding substantially in shape and dimensions to an external form of a double crown of one or more natural teeth and adapted to contain the active substance, wherein said double crown is comprised of an inner crown adapted for engagement with a cut-away tooth stump and of an outer crown placed thereon, said hollow structure having one or more passage openings adapted for the controlled release of certain amounts of the active substance to the oral cavity, the one or more passage openings being at least one of a buccal, palatal or lingual portion for the passage of saliva and of the active substance dissolved therein.

4,959,053

AUTOMATIC STOPPING DEVICE FOR THE INTRAVENOUS DRIP

Cheng-Houng Jang, 5 Alley 39, Lane 81, Leou Chyau West Rd., Gang-Shan Jen, Kaohsiung Hsien, Taiwan

Filed Dec. 17, 1987, Ser. No. 134,064

Int. Cl.[5] A61M 1/00

U.S. Cl. 604—127 5 Claims

1. A flow control device for an intravenous drip system, comprising:

a dripping vessel of elongated generally cylindrical shape, the vessel being of a soft easily squeezable material, the said vessel having an upper opening adapted to be connected to a cap and a lower opening adapted to be connected to a connecting tube which leads to a patient which is to receive the intravenous liquid,

a cap of a material harder than the material of the dripping vessel, said cap adhered to said upper opening, the cap having a pointed bar projecting away from the dripping vessel and adapted to be inserted into a medicine bottle containing solution, said pointed bar having a solution passageway for the flow of liquid from the medicine bottle to the dripping vessel,

a valve element contained within the dripping vessel, said valve element being an elongated downwardly pointed cone of a buoyancy such that it floats in the liquid, the diameter of the top of the cone being less than the inside diameter of the dripping vessel such that liquid can flow around the said top, the valve element being of such a length, and of such a converging diameter that after a liquid reaches a predetermined level in the dripping vessel, a portion of the cone blocks the said lower opening while the said top is sufficiently far above the blocked lower opening that there is room between said lower openings and said top for the vessel to be squeezed by the fingers of the operator to force the valve element upward, while some residual liquid is still contained within the lower portion of the dripping vessel, to concurrently (1) force air up through the cap into the bottle to enhance initiation of liquid flow from the bottle downwardly into the dripping vessel and (2) raise the valve element to open the lower opening to allow the residual liquid to immediately commence flowing down through the lower opening.

4,959,054

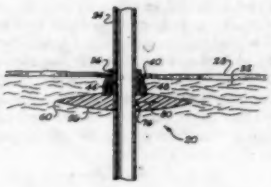
PHARMACEUTICALLY PROTECTED PERCUTANEOUS DEVICES

Gunther Heimke, Clemson; Andreas F. von Recum, Six Mile, and Arun Shanbhag, Spartanburg, all of S.C., assignors to Clemson University, Clemson, S.C.

Filed Nov. 23, 1988, Ser. No. 276,156

Int. Cl.[5] A61M 5/00

U.S. Cl. 604—175 20 Claims



1. A percutaneous device for implantation into a living host such as a human being or an animal, comprising:

(a) a conduit for leading through the skin of the human being or animal into the body of same;

(b) means for dispensing a bioreactive agent during the useful life of the percutaneous device in the living host, said dispensing means contacting said conduit and at least partly surrounding said conduit, said dispensing means having a predetermined size and maintaining said size during dispensing of said agent;

(c) a flange surrounding said conduit and extending radially outwardly therefrom to a free edge of said flange and having a thickness gradually decreasing as an imaginary point moves through said flange radially outwardly to said free edge of said flange, said flange supporting said dispensing means;

(d) said dispensing means including means for permitting said dispensing means to be refilled with said bioreactive agent while the device remains implanted in the living host, said refilling permitting means including a portion of said dispensing means capable of penetration by an instrument for introducing said agent into said dispensing means

and resealing after any such penetration by such instrument;

(e) said dispensing means having a subcutaneous tissue interfacing surface, said surface being permeable to said bioreactive agent to permit said agent to be diffused through said subcutaneous tissue interfacing surface and into the tissue adjacent said surface; and

(f) said subcutaneous tissue interfacing surface of said dispensing means having a permeability coefficient such that permeability increases with an increase in temperature.

4,959,055

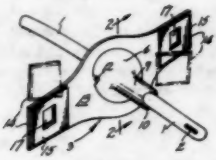
RETAINER FOR A PERCUTANEOUS TUBE

Janice L. Hillyer, 2880 Emerald St., Eugene, Oreg. 97403

Filed Mar. 13, 1989, Ser. No. 322,283

Int. Cl.[5] A61M *25/02*

U.S. Cl. 604—179 **5 Claims**



1. A retainer for flexible tube entering an opening in the human body and comprising in combination,

a base for disposition adjacent an opening in the body,

flexible attachment means on said base and adapted for attachment to the exterior of the body,

a conical projection on said base of a highly resilient nature including an end segment, said conical projection for partial insertion into the body opening so as to surfacially engage body tissue defining said opening to provide a seal therewith, said end segment having an annular edge for frictional engagement with the tube outer wall to retain same against axial displacement, said base and said conical projection defining a circular groove, said flexible attachment means having an inner edge rotatably confined in said groove.

4,959,056

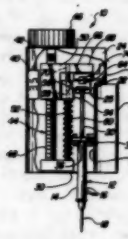
DIGITAL DISPENSER

Mitchell Dombrowski, Grosse Pointe Farms, and Robert Welch, Plymouth, both of Mich., assignors to Wayne State University, Detroit, Mich.

Filed Jun. 14, 1988, Ser. No. 206,607

Int. Cl.[5] A61M *5/00*

U.S. Cl. 604—186 **12 Claims**



1. An aid device (10) of the type for use with a syringe (12) including a barrel (14) for containing a medicant therein and supporting a needle (18) thereon and a plunger (20) having one end operatively disposed within the barrel (14) and a second end including a cap portion (22), said device (10) comprising: housing means (24) including a chamber (28) having a length defining an axis, said housing means (24) having a base portion (30); barrel holder means (34) fixedly mounted within said housing means (24) for holding the barrel (14) of the syringe (12) in a fixed position parallel to said axis while exposing the needle (18) from said housing means (24); plunger holder means (25) mounted within said housing (24) and movable therein along said axis relative to said barrel holder means (34) for holding the plunger (20) and moving the plunger (20) axially relative to the barrel (14); digital readout means operatively connected to said plunger holder mean s (25) for projecting a digital output quantitating the amount of medicant drawn into the barrel (14) by movement of the plunger (20) axially away from the base portion (30); actuator means operatively connected to said plunger holder means (25) for moving said plunger holder means (25) relative to said barrel holder means (34), said actuator means including a vernier screw (44) having a head portion (46) disposed outside of said housing means (24) and a threaded portion (48) extending parallel relative to said axis, said plunger holder means (25) including follower means (50) threadedly connected to said threaded portion (48) for operatively connecting said plunger holder means (25) to said threaded portion (48) whereby turning of said head portion (46) in one direction moves said plunger holder means (25) away from said base portion for drawing the plunger (20) from the barrel (14) and drawing medication into the barrel (14); and release means for operatively releasing said plunger holder means (25) from said threaded portion (48) and biasing means (52) for forcing said plunger holder means (25) towards said base portion (30) along said axis when said release means releases said plunger holder means (25) whereby the plunger (20) is forced into the barrel (14) to eject medication therefrom.

4,959,057

CATHETER FOR ORGAN PERFUSION

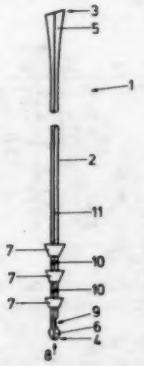
Thomas Lang, Hamburg, Fed. Rep. of Germany, assignor to Fresenius Ag, Gluckensteinweg, Fed. Rep. of Germany

Filed Mar. 23, 1989, Ser. No. 327,941

Claims priority, application Fed. Rep. of Germany, May 28, 1988, 8807003[U]

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—264 **5 Claims**



1. A catheter for vessel perfusion including an elongated tubular shank having proximal and distal ends, characterized in that the distal end is straumatically enlarged in the form of a bead, a first sealing ring concentric with the shank is fixedly carried by the shank and closely spaced in the proximal direction from the distal end, a second sealing ring concentric with

the shank is fixedly carried by the shank and closely spaced in the proximal direction from the first ring, and each sealing ring is of conical form widening in the proximal direction, and a lateral opening is provided in the wall of the shank intermediate the distal end and the first ring.

4,959,058

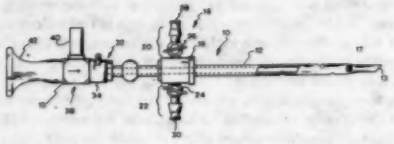
CANNULA HAVING SIDE OPENING

Gary K. Michelson, 438 Sherman Canal, Venice, Calif. 90291

Continuation-in-part of Ser. No. 324,727, Mar. 17, 1989. This application Apr. 24, 1989, Ser. No. 341,850

Int. Cl.[5] A61M *25/00*

U.S. Cl. 604—280 10 Claims



1. A cannula for use with an endoscopic surgical instrument comprising:

a hollow tubular member defining an inside and an outside for surrounding an endoscopic element, said hollow tubular member having a first diameter portion and a second narrow diameter supporting portion having a diameter narrower than the inside diameter of said first diameter portion proximate one end of said hollow tubular member for supporting an endoscopic element with said cannula, said narrow diameter portion in close fitting, free sliding engagement with said endoscopic element, and openings through said hollow tubular member permitting the flow of fluid through said openings from the inside of said cannula to the outside of said cannula.

4,959,059

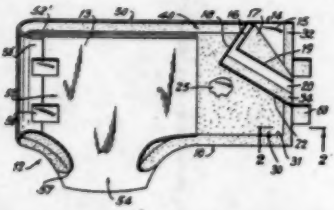
LOW FRICTION MULTILAYER PAD

Kasriel Ellender, New York, and Mille Stand, Croton-on-Hudson, both of N.Y., assignors to Senecare Enterprises, Inc., New York, N.Y.

Filed Jan. 17, 1989, Ser. No. 297,977

Int. Cl.[5] A61F *13/16*

U.S. Cl. 604—358 18 Claims



1. A pad for preventing and treating pressure sores on a person's body and for managing discharged body fluids, comprising:

an outer first layer formed of thin, nonporous, moisture-proof, flexible sheet material having a smooth outer side for abutting a supporting surface, and having a smooth other side;

a second layer formed of soft, porous, moisture absorbent material superimposed on said other side of said first layer to absorb and retain said fluids;

a third layer formed of thin, porous, smooth, fibrous sheet material superimposed on said second layer for passing said fluids through pores in said third layer to said second layer for absorption thereby;

a fourth layer composed of dry, slippery material formed as an extremely thin filmy coating on said third layer, said coating having sufficient body to reduce the coefficient of friction of said third layer, and having sufficient thinness to leave said pores in said third layer unclogged to pass said fluids therethrough;

a fifth layer formed of lubricating material applied to said third and fourth layers and effective to provide a very slippery surface thereat to minimize sliding friction and shear forces between said person's body and said supporting surface, said fifth layer being so applied that said pores in said third layer remain unclogged so that said fluids can pass freely to and through said pores to said second layer for absorption thereby; and

means nondetachably bonding together registering marginal areas of said first, second and third layers in a continuous seam all around their joined peripheries to allow limited sliding movement between unbonded areas of said layers, while said first, second, third, fourth and fifth layers cooperate to minimize sliding friction and shear forces between said person's body and said supporting surface with said pad disposed therebetween.

4,959,060

BODY FLUID-ADSORBING ARTICLE

Tadao Shimomura, Toyonaka; Nobuyuki Harada, and Kunihiko Ishizaki, both of Suita, all of Japan, assignors to Nippon Shokubai Kagaku Kogyo Co., Ltd., Osaka, Japan

Continuation of Ser. No. 121,275, Nov. 16, 1987, abandoned. This application Dec. 12, 1989, Ser. No. 449,456

Claims priority, application Japan, Nov. 17, 1986, 61-271963; Dec. 16, 1986, 61-297517; Dec. 17, 1986, 61-298986

Int. Cl.[5] A61F *13/00*

U.S. Cl. 604—368 21 Claims

1. A body fluid-absorbing article comprising at least one absorbent member which forms a swelled gel when a body fluid is absorbed, comprising 50 to 99% by weight of a fibrous material and 50 to 1% by weight of an absorbent polymer wherein said absorbent polymer is at least one member selected from the group consisting of hydrolyzed starch-acrylonitrile graft polymer, partially neutralized starch-acrylic acid graft polymer, saponified vinyl acetate-acrylic ester copolymer, hydrolyzed acrylonitrile copolymers, cross-linked hydrolyzed acrylonitrile copolymers, hydrolyzed acrylamide copolymers, cross-linked hydrolyzed acrylamide copolymers, partially neutralized polyarcylic acid, cross-linked partially neutralized polyacrylic acid, and isobutylene-maleic anhydride copolymer, said absorbent member containing at least one species compound (A) selected from the group consisting of sulfur-containing reducing agents, antioxidants, and oxidizing agents, wherein said sulfur-containing reducing agent is at least one member selected from the group consisting of thiosulfates, sulfurous acid, sulfites, hydrogen sulfites dithionites, hydrosulfides, and mercaptans, and said compound (A) being present in a physical mixture with said absorbent polymer in an amount capable of preventing the swelled gel of the absorbent polymer from being deteriorated or decomposed with an elapse of time.

4,959,061

HYDROPHILIC POLYMER BASED ON ACRYLIC ACID AND ALKALI METAL ACRYLATE, ITS METHOD OF PREPARATION AND ITS APPLICATION AS AN ABSORBENT, IN PARTICULAR OF A PHYSIOLOGICAL SOLUTION

Jean Cabestany, Stains, France, assignor to Societe Francaise Hoechst, Puteau, France

Filed Apr. 1, 1988, Ser. No. 176,193
Claims priority, application France, Apr. 14, 1987, 87 05250
Int. Cl.[5] A61F 13/16
U.S. Cl. 604—368 10 Claims

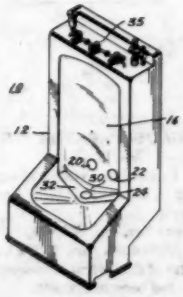
1. A cross-linked hydrophilic polymer which is insoluble in water which is based on acrylic acid and alkali metal acrylate, having a high degree of absorbency in respect of a saline physiological solution, of the order of 50 to 70 gr per gram, and which is solely composed of 20% to 45% of acrylic acid, in molar proportions, and 80% to 55% of potassium acrylate, in molar proportions, to the exclusion of any other monomer.

4,959,062

INTEGRATED SOFT SHELL RESERVOIR

Barry Gellman, Billerica, Mass., assignor to C. R. Bard, Inc., Murray Hill, N.J.

Filed Feb. 23, 1989, Ser. No. 313,862
Int. Cl.[5] A61B 19/00
U.S. Cl. 604—403 3 Claims



1. A fluid reservoir, comprising:

a rigid shell with an open face and an inner surface, said shell including; a top, a funnel shaped bottom including a lowermost point, and an interconnecting wall portion between said top and said bottom, an outlet opening defined through said funnel shaped bottom at said lowermost point for drainage of fluid from said reservoir, a peripheral edge extending around the open face of said shell, inlet means in said shell for introduction of fluid into said reservoir.

a flexible membrane sealingly secured to said peripheral edge and extending across said open face and in overlying relation to said inner surface of said shell and defining therewith a fluid receiving chamber for reception of fluid introduced into said reservoir, said membrane being selectively expandable relative to said shell inner surface upon introduction of fluid, and intimately conformable with the inner surface of said shell upon drainage of fluid through said outlet opening, said membrane upon drainage of fluid through said outlet opening overlying and sealing said outlet opening, and

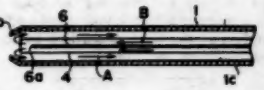
means on said funnel shaped bottom for precluding sealing of said outlet opening until a complete drainage of fluid from said chamber between said shell inner surface and said membrane, said means for precluding sealing of said outlet opening including a ridge on said inner surface in said funnel shaped bottom adjacent to said outlet opening and extending beyond said outlet opening for selective support of said membrane above said outlet opening immediately adjacent thereto as fluid is drained and until drainage is complete, wherein said ridge tapers from a maximum height, relative to said inner surface, adjacent said outlet opening to opposed outer ridge ends merging with said inner surface laterally of said outlet opening and adjacent said wall portion.

4,959,063

SPINAL NEEDLE WITH OPTICAL FIBER MEANS FOR RADIATING A LASER BEAM

Toshio Kojima, Tokyo, Japan, assignor to Osada Research Institute, Ltd., Tokyo, Japan

Filed Sep. 14, 1988, Ser. No. 244,437
Claims priority, application Japan, May 12, 1988, 63-63175
Int. Cl.[5] A61B 17/36
U.S. Cl. 606—15 15 Claims



1. A spinal needle insertable into the vertebral pulp to a treatment site comprising a hollow first cylinder means having an open distal end disposable at said treatment site, a second cylinder means disposed within said first cylinder means, said first cylinder means having an inner diameter greater than the outer diameter of said second cylinder means to thereby define a first flow passage between said first and second cylinder means, optical fiber means disposed within said second cylinder means for radiating a laser beam through said open distal end of said first cylinder means to said treatment site, said second cylinder means having an inner diameter greater than the outer diameter of said optical fiber means to thereby define a second flow passage between said second cylinder means and said optical fiber means, fluid introduction means on said second cylinder means for introducing a fluid into said second flow passage, said second cylinder means having an open distal end terminating within said first cylinder means juxtaposed to said open distal end of said first cylinder means such that said fluid passes from said open distal end of said second cylinder means into said first cylinder means and is evacuated through said first passage means, said open distal end of said first cylinder means receiving gas generated at said treatment site when the vertebral pulp is evaporated by radiating said laser beam onto said treatment site, said generated gas being evacuated through said first flow passage, said distal end of said first cylinder means having a converging section which converges radially inwardly to define a taper to facilitate insertion and penetration of said spinal needle into a person's body to said treatment site.

4,959,064

DYNAMIC TENSION BONE SCREW

John A. Engelhardt, Warsaw, Ind., assignor to Boehringer Mannheim Corporation, Indianapolis, Ind.

Filed Oct. 7, 1988, Ser. No. 255,154
Int. Cl.[5] A61F 5/04; F16B 43/02; A61C 8/00
U.S. Cl. 606—65 5 Claims

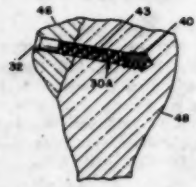
1. A dynamic fixation screw constructed wholly from an elongated screw having a longitudinal axis for rejoining fracture fragments of a bone in their approximate original mutual dispositions comprising:

a threaded distal end member for threaded engagement with one of the bone fragments;

a head member at a proximal end for engagement with another of the bone fragments; and

a threaded shank member of reduced outer diameter inter-

mediate said distal end member and said head member, said elongated screw having a bore therein coaxial with said longitudinal axis extending through said head member and said shank member and having a diameter that slightly exceeds the root diameter of the threads in said



threaded shank member thereby resulting in a spring member integral with said distal end member and with said head member for drawing the bone fragments together in a manner which continuously adjusts the force being applied to the bone according to the stress relaxation manifested by the bone.

4,959,065

BONE PLATE WITH POSITIONING MEMBER

G. William Arnett, Santa Barbara; Rick A. Buss, Camarillo, and Robert A. Bruce, Ventura, all of Calif., assignors to Techmedica, Inc., Camarillo, Calif.

Filed Jul. 14, 1989, Ser. No. 379,993
Int. Cl.[5] A61F 5/04
U.S. Cl. 606—69 **20 Claims**

1. A bone plate for use in bone fractures comprising the combination of:

a generally planar plate of inert material having at least two spaced openings adapted to receive fasteners for securing said plate, said plate having a generally flat surface adapted to be placed adjacent to the bone to which said plate is to be affixed and the opposed surface thereof being generally flat with rounded edges, said plate having a readily removable positioning member which is of sufficient size to manipulate and ready said bone plate for fixation, said positioning member being adapted for quick and easy separation from said bone plate after fixation of said bone plate and intended to be removed after fixation, and said positioning member not having any of said spaced openings therein.

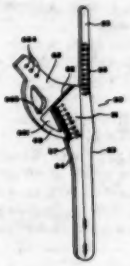
4,959,066

FEMORAL OSTEOTOMY GUIDE ASSEMBLY

Harold K. Dunn, Salt Lake City, Utah; Mark A. Lazzeri, and Jeffrey M. Ondria, both of Warsaw, Ind., assignors to Zimmer, Inc., Warsaw, Ind.

Filed Feb. 24, 1989, Ser. No. 315,101
Int. Cl.[5] A61B 17/56
U.S. Cl. 606—89 **31 Claims**

1. An osteotomy guide assembly for femoral neck osteotomy comprising a means for attaching the assembly to the proximal portion of a femur, a transverse support bar extending from said attachment means and a saw guide means which is attached to the support bar by a single locking means, and



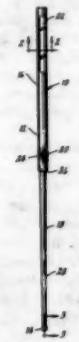
wherein said single locking means provides for positional adjustment of the saw guide means relative to the support bar in at least two different linear directions.

4,959,067

MANUAL SURGICAL SEPARATOR STRUCTURE AND METHOD

George H. Muller, Ann Arbor, Mich., assignor to Joseph J. Berke, Detroit and A.I.R. Foundation, Ann Arbor, both of, Mich., a part interest

Continuation-in-part of Ser. No. 582,971, Nov. 21, 1983, Pat. No. 4,709,697. This application Nov. 5, 1987, Ser. No. 117,051
The portion of the term of this patent subsequent to Dec. 1, 2004, has been disclaimed.
Int. Cl.[5] A61B 17/00
U.S. Cl. 606—190 **19 Claims**



1. Surgical separator structure comprising an elongated shaft constructed of a non-helical shaped member extending straight in the direction of elongation for most of its length including a handle at one end, a transversely directionally universally, easily flexed other end, and a tip at the other end for displacing or separating tissue on contact therewith.

4,959,068

STERILE SURGICAL NEEDLE HAVING DARK NON-REFLECTIVE SURFACE

Lee Bendel, Lebanon, and Florence Stoffel, Ringoes, both of N.J., assignors to Ethicon, Inc., Somerville, N.J.

Division of Ser. No. 160,226, Feb. 25, 1988, Pat. No. 4,905,615, which is a continuation-in-part of Ser. No. 926,759, Nov. 4, 1986, abandoned, which is a continuation-in-part of Ser. No. 632,343, Jul. 19, 1984, abandoned. This application Jul. 27, 1989, Ser. No. 385,510

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—222 5 Claims

1. A method of manufacturing sterile surgical needles having uniform non-reflective black surfaces, said surfaces being non-flaking, said method comprising:

(a) selecting a needle containing chromium, said needle having a desired configuration and sharpness,

(b) treating the surface of said needle by electropolishing to activate the needle surface to allow the chromium to form oxides,

(c) submersing said treated needle in a solution of sulfuric acid potassium dichromate, and water,

(d) maintaining the temperature of the solution in excess of 100° C. while the needle is submersed,

(e) maintaining the needle in said heated solution for a sufficient length of time to uniformly darken the surface whereby said surface is non-reflective,

(f) removing the needle from the bath, and

(g) sterilizing the needle.

4,959,069

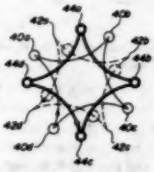
BRAIDED SURGICAL SUTURES

Karl W. Brennan, Somerset; Alison M. Skinner, Long Valley, both of N.J., and Gregory Weaver, New Hope, Pa., assignors to Ethicon, Inc., Somerville, N.J.

Filed Oct. 20, 1989, Ser. No. 424,622

Int. Cl.[5] A61B *17/00*

U.S. Cl. 606—228 17 Claims



1. A braided surgical suture in which a plurality of surgically compatible filaments are woven in a spiral braid by moving filament dispensers to different positions around a closed loop, wherein an individual dispenser in the loop is moved from its current position to a succeeding position which is at least two positions removed from said current position.

4,959,070

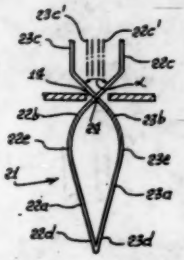
INTRAOCULAR LENS IMPLANTATION

Henry H. McDonald, 65 N. Madison, Suite 810, Pasadena, Calif. 91101

Continuation of Ser. No. 42,881, Apr. 27, 1987, Pat. No. 4,813,957. This application Jan. 27, 1989, Ser. No. 302,209

Int. Cl.[5] A61F *2/16*; A61B *17/28*

U.S. Cl. 623—6 2 Claims



1. A surgical forceps useful for eye surgery wherein an incision is made in the eye corsocleral tissue, the incision being less than about 3 mm in width, said forceps comprising:

(a) a first arm extending generally forwardly to merge with a first diagonal portion defined by said arm, said diagonal portion extending forwardly and rightwardly, and a first blade carried by said first diagonal portion,

(b) a second arm extending generally forwardly to merge with a second diagonal portion defined by the second arm, said second diagonal portion extending forwardly and leftwardly, and a second blade carried by said second diagonal portion,

(c) said first and second diagonal portions together defining a cross-over locus adapted to be shifted away from the blades as the blades are expanded relatively away from one another in the eye,

(d) whereby motion may be transmitted from the arms to the blades facilitating expanding of the blades while the cross-over point is maintained in or proximate said incision,

(e) the overall cross-dimension of the diagonal portions of the arms at the cross-over locus at all times during blade expansion being less than about 3 millimeters,

(f) the forceps having a first position in which a plastic lens is folded into flattened U-shape and is clamped between the blades, the forceps manipulated to introduce the blades and folded lens through the incision and into an eye lens zone from which a natural lens has been removed, the cross-over locus then located at or closely proximate said incision,

(g) the forceps having a second position in which the blades are expanded apart wider than the width of the incision, and to an extent in excess of about 7 mm, thereby releasing the plastic lens by unfolding to accommodate to said zone, the cross-over locus at that time maintained located at or proximate said incision,

(h) the forceps having a third position in which the blades are relatively closed together in said eye zone, with the cross-over locus at that time maintained at or proximate said incision, to accommodate withdrawal of the relatively closed together blades from said zone and via the incision,

(i) each blade having a concave surface portion to match or approximately match the surface convex curvature of a plastic molded lens, and a second surface portion to match or approximately match the outer surface of a plastic molded lens haptic, and including said plastic lens folded upon itself into U-shape and retained between said blade first portion and second portion,

(j) said blades extending forwardly relative to said diagonal portions.

4,959,071

PARTIALLY STABILIZED KNEE PROSTHESIS

David R. Brown, and Jeff L. Martin, both of Warsaw, Ind., assignors to Biomet, Inc., Warsaw, Ind.

Continuation-in-part of Ser. No. 151,659, Feb. 3, 1988, Pat. No. 4,892,547. This application Feb. 3, 1989, Ser. No. 305,713

Int. Cl.[5] A61F 2/38

U.S. Cl. 623—20 14 Claims

1. A knee joint prosthesis, comprising:

a femoral component having a pair of paced-apart condylar bearing portions, an anterior intercondylar portion, a posterior intercondylar portion, and an intercondylar opening between the anterior intercondylar portion and the posterior intercondylar portion, the posterior intercondylar portion having an exterior surface with a raised ridge thereon that extends along the exterior surface of the posterior intercondylar portion generally parallel to the spaced apart condylar bearing portions, the femoral components having an interior contour which closely matches an exterior contour of the end of the femur after the femur has been prepared to receive the femoral component, the interior contour of the femoral component being at least partially defined by generally horizontal superior surfaces of the condylar bearing portions and by the intercondylar opening, the intercondylar opening lying in a common plane with, and inferiorly to, said horizontal superior surfaces of the condylar bearing portions,

a tibial component having a pair of spaced-apart bearing surfaces for supporting the condylar bearing portions of the femoral component and having an intercondylar portion including a posterior intercondylar portion between the bearing surfaces of the tibial component, the posterior intercondylar portion of the tibial component having a groove formed therein which extends therethrough generally parallel to the spaced-apart condylar bearing portions of the femoral component when the spaced-apart condylar bearing portions of the femoral component are supported by the bearing portions of the tibial component,

wherein the ridge of the femoral component is received in the groove of the tibial component when the intercondylar bearing portions of the femoral component are supported on the bearing portions of the tibial component, the ridge rotatably slides in the groove when the knee flexes and the ridge and groove coact to reduce anterior movement of the femoral component as the knee flexes; and

wherein the intercondylar portion of the tibial component does not extend all the way through the intercondylar opening of the femoral component.

4,959,072

IMPLANT FOR STRENGTHENING THE EDGE OF A HIP BONE

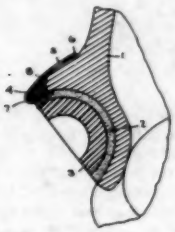
Erwin W. Morscher, Basel, and Otto Frey, Winterthur, both of Switzerland, assignors to Sulzer Brothers Limited, Winterthur and Protek AG, Berne, both of, Switzerland

Filed Dec. 27, 1988, Ser. No. 290,439

Claims priority, application Switzerland, Jan. 14, 1988, 0131/88

Int. Cl.[5] A61F 2/34

U.S. Cl. 623—22 7 Claims



1. An implant for strengthening the edge of a hip bone comprising a multi-layer porous wire mesh formed into a shell of part cylindrical shape, said shell defining a first portion of trough shape to receive spongiosa therein and a fixing strip extending from said first portion and having apertures therein for fixing screws to be threaded into a hip bone.

4,959,073

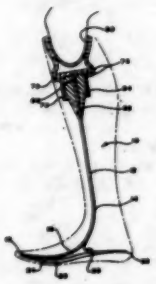
FOOT PROSTHESIS AND METHOD OF MAKING SAME

John Merlette, 1208 E. Mockingbird La., Sandy, Utah 84070

Filed Jun. 6, 1988, Ser. No. 202,821

Int. Cl.[5] A61F 2/66

U.S. Cl. 623—55 15 Claims



1. A foot prosthesis comprising an elongate composite main member having a leg section, a toe section, and a heel member, one end of said leg section being adapted to be connected to an amputation socket, the other end smoothly curving forwardly into the toe section which extends forwardly of the leg section to a toe end and then curving sharply rearwardly and extending rearwardly from the toe end substantially along and generally adjacent to the toe section to a point of divergence from where the heel member continues rearwardly to a heel tip while the toe section curves upwardly to the leg section; and resilient material adhered between the toe section and the heel member substantially through the area where the two are generally adjacent to restrain and control relative movement between the adjacent toe section and heel member.

4,959,074

METHOD OF HYDROPHILIC COATING OF PLASTICS

Gergory Halpern, Wilson Park Dr., Tarrytown, N.Y. 10591; Charles Campbell, Highwood Pl., Alpine, N.J. 07620; Ellington M. Beavers, 931 Coates Rd., Meadowbrook, Pa. 19046, and Huk Y. Chen, 42-01 Auburndale La., Flushing, N.Y. 11358

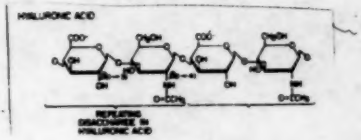
Division of Ser. No. 643,598, Aug. 23, 1984, Pat. No. 4,801,475. This application May 25, 1988, Ser. No. 198,356

Int. Cl.[5] B05D *3/04;* A61F *2/16*

U.S. Cl. 623—66 1 Claim

1. An optically clear plastic having at least one exterior surface with a hydrophilic coating immobilized by crosslinking, comprising:

(a) a first coating of an aqueous solution of mucopolysaccharide which is dried by applying a water-miscible solvent from the group consisting of acetone, methyl alcohol, methyl ethyl ketone and ethyl alcohol; and



(b) a second coating of a solution of catalyzed organic-soluble aliphatic polyisocyanate, applied as a crosslinker and immobilizer.

4,959,075

SILICATE- AND MAGNESIUM-FREE STABILIZER HYDROGEN PEROXIDE MIXTURES FOR BLEACHING PROCESSES

Bernd D. Baehr, Neuss; Ulrich Rall, Langenfeld; Hildegard van Delden, Hilden, and Wolfgang Lillotte, Moenchengladbach, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Division of Ser. No. 290,881, Dec. 22, 1988, Pat. No. 4,880,566, which is a continuation of Ser. No. 945,921, Dec. 23, 1986, abandoned. This application Sep. 7, 1989, Ser. No. 404,140

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1985, 3545909

Int. Cl.[5] D06L 3/02, 3/04

U.S. Cl. 8—111 12 Claims

1. A process for bleaching cellulose fibers and mixtures of cellulose and synthetic fibers comprising contacting said fibers with an aqueous stabilized 35% by weight 35 weight hydrogen peroxide solution wherein said hydrogen peroxide solution is stabilized with a silicate-free and magnesium-free stabilizer mixture comprising:

(A) polyhydroxy- and/or hydroxycarboxylic acid, and their alkali metal ammonium salts;

(B) polyacrylic acid, and said acid in partially neutralized form; and

(C) polyamine and/or amine polyphosphonic acid, and their alkali metal and/or ammonium salts;

with the proviso that the ratio by weight of components A:B:C is 1 to 6:0.2 to 1:0.4 to 4.

4,959,076

SYNTHETIC ROSEWOOD AND METHOD OF PRODUCTION THEREOF

Philip C. Rolffs, 629 S. Shore Dr., P.O. Box 175, Portage, Mich. 49081

Continuation-in-part of Ser. No. 206,190, Jun. 10, 1988, Pat. No. 4,840,637, which is a continuation of Ser. No. 933,478, Nov. 21, 1986, abandoned. This application May 11, 1989, Ser. No. 350,510

Int. Cl.[5] D06P 3/60

U.S. Cl. 8—402 24 Claims

1. A method of treating wood of the genus Juglans to change its color completely and throughout the entire structure and substance thereof essentially to various shades of dark brown with conspicuous black streaks, thereby providing a rosewood substitute, comprising the following steps:

placing the starting wood into a vacuum/pressure vessel,

drawing a vacuum in the vessel,

allowing the vessel to stand until essentially all the extractable water and air is extracted from the wood,

introducing an aqueous solution of an iron salt having a concentration not greater than about eighteen percent (18%) by weight into the vessel, while maintaining the vacuum therein,

thereafter applying an elevated pressure inside of the vessel,

allowing the vessel to stand until essentially the maximum possible amount of iron salt solution is absorbed by said wood,

releasing the pressure in the vessel,

draining fluid from the vessel,

removing the wood from the vessel,

washing the wood with water, and

drying the thus-treated wood at an elevated temperature of about 130° F. to about 180° F. to produce a synthetic rosewood product.

4,959,077

FUELS FOR GASOLINE ENGINES

Franz-Dieter Martischius, Neustadt; Hans P. Rath, Gruenstadt; Hans-Henning Vogel, Frankenthal; Norbert Greif, Bobenheim; Knut Oppenlaender, Ludwigshafen; Walter Denzinger, Speyer, and Heinrich Hartmann, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 243,072

Claims priority, application Fed. Rep. of Germany, Sep. 15, 1987, 3730885; Oct. 1, 1987, 3733172

Int. Cl.[5] C10L 1/18, 1/22

U.S. Cl. 44—62 3 Claims

1. A fuel for four-stroke gasoline engines which comprises gasoline and from 10 to 2,000 ppm by weight of a copolymer of an olefin of from 2 to 40 carbon atoms and/or a cycloolefin of from 3 to 10 carbon atoms with maleic anhydride having a total molecular weight of from 500 to 20,000 g per mole, the carboxyl groups on the copolymer having been wholly or partly converted with an alkali metal to form an alkali metal salt and the remaining carboxyl groups having been converted with an alcohol and/or an amine of up to 50 carbon atoms into the corresponding ester and/or amide groups and/or ammonium salts.

4,959,078

HOT-GAS COOLING PLANT

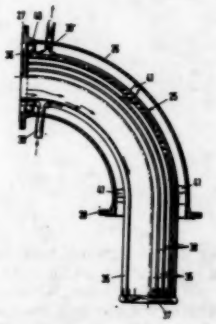
Georg Ziegler, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Oct. 3, 1989, Ser. No. 416,542

Claims priority, application Switzerland, Oct. 26, 1988, 03986/88

Int. Cl.[5] C10J 3/82, 3/84, 3/86

U.S. Cl. 48—128 11 Claims



1. A hot-gas cooling plant comprising

a radiant cooler including a first vertically disposed cylindrical pressure vessel, an insert of tubes disposed coaxially in said pressure vessel to define a first gas flue, a gas supply duct in said pressure vessel connected to said insert in communication with said gas flue, and a shell of tubes surrounding said insert to define an annular second gas flue therebetween, said second gas flue being in communication with said first gas flue;

at least one convection cooler alongside said radiant cooler including a second vertically disposed cylindrical pressure vessel and bunches of cooling tubes in said second pressure vessel;

a gas outlet line extending from said first pressure vessel on a curved axis to an upper end of said second pressure vessel, said gas outlet line being in communication with said second gas flue and the interior of said second pressure vessel, said gas outlet line having a flange at each end

for releasable connection to a flange on each respective pressure vessel;

a plurality of tubes in said gas outlet line for conveying a coolant therethrough and bent to follow said curved axis to cool said gas outlet line;

an annular collector within a gas intake end of said gas outlet line in communication with said bent tubes, each bent tube being in communication with at least one other bent tube at a gas exhaust end of said gas outlet line; and

partitions in said collector for dividing said collector into two chambers, one of said chambers being in communication with some of said bent tubes and a coolant supply and the other of said chambers being in communication with others of said bent tubes and a coolant outlet.

4,959,079

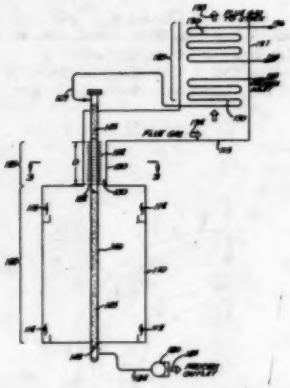
STEAM REFORMING PROCESS WITH LOW FIRED DUTY

Bernard J. Grotz, Pasadena, and Vito Frankini, Arcadia, both of Calif., assignors to Santa Fe Braun Inc., Alhambra, Calif.

Continuation of Ser. No. 112,722, Oct. 23, 1987, abandoned. This application May 9, 1989, Ser. No. 351,313

Int. Cl.[5] C01B 3/34

U.S. Cl. 48—198.7 **9 Claims**



1. A method for the production of hydrogen from a hydrocarbon stream in a steam reforming furnace for a hydrogen or ammonia plant, said furnace having a radiant section and a convection section, the width of the furnace in the convection section being substantially narrower than the width of the radiant section to provide enhanced velocity to the flue gas, the furnace containing a plurality of reforming catalyst-containing single pass tubes, the portion of each of said tubes within said furnace being filled with reforming catalyst, comprising the steps of:

preheating the hydrocarbon stream;

introducing, heating and reacting the hydrocarbon stream and steam in said tubes within said convection section of the furnace wherein a portion of the catalyst-filled tubes have an extended surface integral with or attached to an outer surface of said tubes within the convection section to enhance convection heat transfer to the hydrocarbon stream within the catalyst-filled tube; and thereafter

heating the hydrocarbon stream in said radiant section of the furnace in another portion of said tubes having a substantially bare outer surface within the radiant section thereby causing the hydrocarbon and steam to flow through the tubes in a direction countercurrent to the flow of flue gas through the furnace.

4,959,080

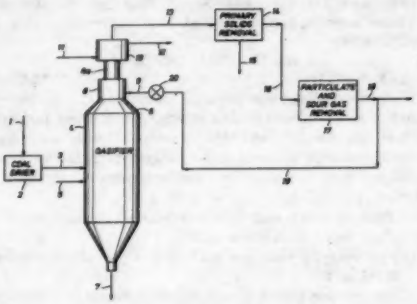
PROCESS FOR GASIFICATION OF COAL UTILIZING REACTOR PROTECTED INTERALLY WITH SLAG COALESCING MATERIALS

Charles V. Sternling, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Jun. 29, 1989, Ser. No. 372,806

Int. Cl.[5] C10J 3/46, 3/72

U.S. Cl. 48—210 **6 Claims**



1. A process for the gasification of coal comprising oxidizing coal under conditions to produce hot synthesis gas containing flyslag and having a temperature of from about 1050° C. to about 1800° C., the oxidizing being carried out in a reactor comprising a vessel or tube having an inner reaction space bounded by a wall surface or surfaces protected by a refractory liner between the space and at least a portion of the wall surface or surfaces, the surface of the liner defining the reaction zone of the reactor being coated or lined with at least two contiguous layers of different slag coalescing materials, the layers of materials being arranged in order of increasing melting point of the respective materials toward the internal reaction space of the reactor vessel or tube.

4,959,081

SEALING AND TRIMMING

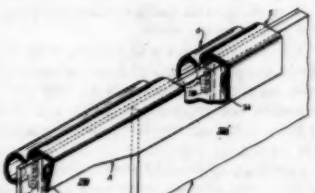
Lionel Mathellier, Chartres, France, assignor to Draftex Industries Limited, Edinburgh, Scotland

Filed Aug. 2, 1989, Ser. No. 388,987

Claims priority, application United Kingdom, Aug. 9, 1988, 8818887

Int. Cl.[5] E06B 7/16

U.S. Cl. 49—490 **9 Claims**



1. A channel-shaped strip for embracingly gripping a support member of known variable thickness, the channel of the strip having, prior to fitment to the support member, a width which varies along the length of the strip in a predetermined manner so as to match the known variation in thickness of the support member.

4,959,082

POLYCARBONATE GAS SEPARATION MEMBRANES CONTAINING SUBSTITUTED BENZENES AND PROCESSES FOR MAKING AND USING THE SAME

Wudneh Admassu, Concord, and Daniel O. Clark, Benicia, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 20, 1989, Ser. No. 383,952
Int. Cl.[5] B01D 53/22, 71/50
U.S. Cl. 55—16 25 Claims

1. A process for separating gases using a semi-permeable gas separation membrane comprising:

A. contacting one side of a semi-permeable membrane with a feed gas mixture under pressure, wherein the membrane divides a separation chamber into a high pressure side into which the feed gas mixture is fed and a low pressure side;

B. maintaining a pressure differential across the membrane under conditions such that at least one component of the gas mixture selectively permeates through the membrane from the high pressure side to the low pressure side of the membrane;

C. removing from the low pressure side of the membrane permeated gas which is enriched in at least one faster permeating component of the gas mixture; and

D. removing from the high pressure side of the membrane non-permeated gas which is depleted in at least one faster permeating component of the gas mixture;

wherein the membrane comprises a thin discriminating layer of a polycarbonate gas separation membrane containing at least one substituted benzene in an amount effective to interact with the polycarbonate polymer and increase the gas flux and/or gas selectivity of the membrane by at least about 10 percent without causing a significant decrease in the tensile strength of the membrane.

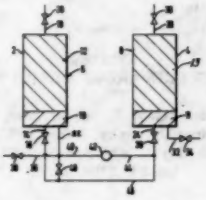
5. A semi-permeable gas separation membrane comprising a thin discriminating layer of a polycarbonate polymer containing at least one substituted benzene in an amount effective to interact with the polycarbonate polymer and increase the gas flux and/or gas selectivity of the membrane by at least about 10 percent without causing a significant decrease in the tensile strength of the membrane.

4,959,083

SEPARATION OF GAS MIXTURES

Michael E. Garrett, Woking, United Kingdom, assignor to The BOC Group plc, Windlesham, England

Filed May 8, 1989, Ser. No. 348,547
Claims priority, application United Kingdom, May 27, 1988, 8812642
Int. Cl.[5] B01D 53/04
U.S. Cl. 55—26 7 Claims



1. A method of separating oxygen from air comprising repeatedly performing the following sequence of steps:

(a) passing compressed air into a first bed of adsorbent that adsorbs oxygen more rapidly than nitrogen and argon, and discharging from the first bed unadsorbed gas comprising nitrogen and a part of the argon content of the compressed air;

(b) stopping the passage of the compressed air into the first bed;

(c) placing the first bed in communication with a second bed of adsorbent that is able to effect a separation as between nitrogen and oxygen and having a lower initial pressure than the first bed so that the pressures in the first and second beds tend toward equalization to initiate desorption of adsorbed oxygen in the first bed with the decrease in pressure therein, to cause a gas mixture to flow from the first bed to the second bed, the gas mixture including two major components comprising the desorbed oxygen and nitrogen present in the unadsorbed gas remaining in the first bed after passage of the compressed air thereto is stopped, and to initiate adsorption of one of the major components in the second bed with the increase in pressure therein;

(d) recompressing at least some of the gas mixture;

(e) passing the recompressed gas mixture into the second bed to raise the pressure in the second bed to a higher value than that of the first bed; and

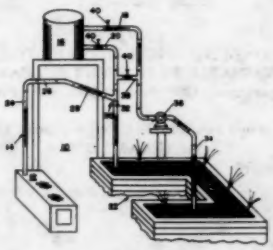
(f) producing product oxygen from the second bed via withdrawing gas not adsorbed in the second bed, and then regenerating said second bed by desorbing gas therefrom and causing the desorbed gas to flow out of the second bed.

4,959,084

COMBINED AIR AND WATER POLLUTION CONTROL SYSTEM

Billy C. Wolverton, and Lamont R. Jarrell, both of Picayune, Miss., assignors to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 26, 1989, Ser. No. 357,938
Int. Cl.[5] B01D 53/04
U.S. Cl. 55—68 15 Claims



1. A process for removing pollutants from a source of polluted air and from a source of waste fluid comprising:

combining said polluted air and said waste fluid by continuously flowing said waste fluid past said source of polluted air for entrainment of said polluted air into said waste fluid;

circulating said combined polluted air and said waste fluid through a filter for removal of pollutants from said air and waste fluid; and,

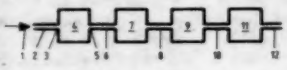
re-circulating the filtered waste fluid past said source of polluted air for entrainment of additional said polluted air into said fluid.

4,959,085

PROCESS AND INSTALLATION FOR THE TREATMENT OF A STREAM OF GAS CONTAINING PYROPHORIC DUST

Maurits C. Van Camp, Mortsel; Philippe M. Wattel, Berchem, and André L. Delvaux, Wilrijk, all of Belgium, assignors to Metallurgie Hoboken-Overpelt, Hoboken, Belgium

Filed Feb. 22, 1989, Ser. No. 313,512
Claims priority, application Belgium, Mar. 9, 1988, 08800257
Int. Cl.[5] B01D 47/06
U.S. Cl. 55—72 23 Claims



1. A process for treating a stream of exhaust gas containing oxygen and pyrophoric dust, comprising the steps of

(a) continuously taking care that the stream of exhaust gas shall be mixed with turbulence and have for at least 1 second a temperature of at least 270° C., while keeping the temperature of gas below 500° C., and

(b) sending the stream of exhaust gas resulting from step (a) through a bag filter, step (a) being carried out prior to step (b).

15. The process according to claim 1 wherein the exhaust gas from step (a) is cooled before being sent through said bag filter.

4,959,086

REMOVING HYDROGEN SULPHIDE FROM A GAS MIXTURE

Johannes F. Van Baar, and Walterus J. Van Lith, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 20, 1989, Ser. No. 424,649
Claims priority, application United Kingdom, Oct. 25, 1988, 8824943
Int. Cl.[5] B01D 53/14
U.S. Cl. 55—73 11 Claims

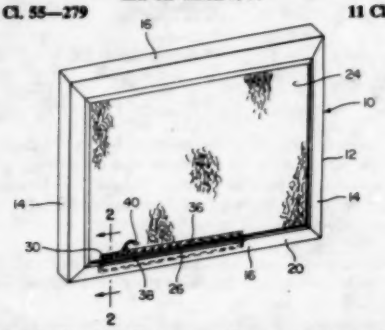
1. A process for removing hydrogen sulphide from a gas mixture including hydrogen sulphide comprising contacting the gas mixture with a liquid absorbent composition comprising an aminopyridine.

4,959,087

AIR CONDITIONING SYSTEM FILTER WITH VARIABLE RATE SCENT RELEASE

James Kappernaros, 1205 Powers Run Rd., Pittsburgh, Pa. 15237

Filed Jun. 14, 1989, Ser. No. 365,830
Int. Cl.[5] A61L 9/04
U.S. Cl. 55—279 11 Claims



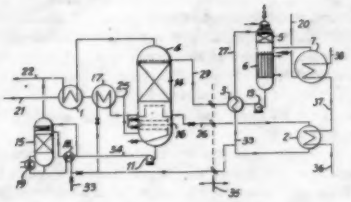
1. An air filter including a generally rectangular, panel-like batt of filter material supported from a surrounding rectangular frame incorporating four sides, each of said sides being generally U-shaped in cross section including a pair of opposite side elongated flanges extending therealong and interconnected along one pair of corresponding longitudinal margins by a bight portion extending therebetween with said frame sides opening inwardly of the periphery of said frame and each frame side receiving the corresponding marginal edge of said batt between the opposing surfaces of the other pair of longitudinal margins of the opposite side flanges thereof, an elongated scented material bar extending longitudinally along one of said frame sides and stationarily supported between one of said side flanges of said one frame side and the opposing marginal edge portion of said batt with a major portion of said bar disposed between said side flanges of said one frame side, said scented bar including at least one exposed surface thereof facing outwardly from between said side flanges inwardly of said frame.

4,959,088

METHOD OF PRODUCING NITRIC ACID AND REFRIGERATION

Andrija Fuderer, Residencial Mediterrani 2, 17210 Calella de Palafrugell, Spain

Filed Apr. 14, 1989, Ser. No. 339,238
Int. Cl.[5] F25J 1/02
U.S. Cl. 62—23 19 Claims



1. A method of producing nitric acid and refrigeration, said method comprising the steps of:

evaporating liquid ammonia to obtain ammonia vapor whereby refrigeration is produced;

absorbing the ammonia vapor by a lean ammonia solution to obtain a rich ammonia solution;

stripping ammonia from the rich ammonia solution with air whereby an air-ammonia mixture, a lean ammonia solution, and additional refrigeration are produced; and

using a portion of the lean ammonia solution produced as a result of stripping the rich ammonia solution with air for absorbing further ammonia vapor obtained as a result of evaporation of further liquid ammonia, to obtain a further rich ammonia solution for producing a further air-ammonia mixture.

4,959,089

PROCESS FOR PREPARING A BARIUM TITANATE FILM

Atit Bhargava, and Robert L. Snyder, both of Alfred, N.Y., assignors to Alfred University, Alfred, N.Y.

Filed May 3, 1988, Ser. No. 189,797
Int. Cl.[5] C03C 10/02
U.S. Cl. 65—33 20 Claims

1. A process for preparing a tetragonal barium titanate film with a thickness of from about 0.1 millimeter to about 1.5 millimeters, comprising the steps of sequentially:

(a) providing a batch comprising from about 46 to about 54 mole percent of a barium compound, from about 18 to about 32 mole percent of a titanium compound, and from about 32 to about 18 mole percent of a boron compound, wherein each of said compounds is calculated on the oxide basis in mole percent and wherein:

1. said barium compound is selected from the group consisting of barium oxide, barium carbonate, barium nitrate, barium oxalate, barium hydroxide, barium peroxide, barium per-hydrateoxide, barium acetate, and mixtures thereof;
2. said titanium compound is selected from the group consisting of titanium dioxide, titanium monoxide, titanium sesquioxide, titanium oxalate, and mixtures thereof;
3. said boron compound is selected from the group consisting of boron oxide, boric acid, metaboric acid, tetraboric acid, and mixtures thereof;
4. said titanium compound, and said boron compound contains less than about 0.1 percent by weight, of impurities, and said barium compound contains less than 1.0 percent, by weight, of impurities;

(b) melting said batch at a temperature of from about 1300 to about 1400 degrees centigrade for from about 25 to about 40 minutes until it is molten;

(c) reducing the temperature of the molten batch from the temperature of the melt to ambient temperature in a period of less than about 30 seconds, thereby producing glass;

(d) placing the glass upon a surface of a polycrystalline isostructural substrate, thereby producing a substrate/glass assembly;

(e) subjecting the substrate/glass assembly to a temperature of from about 1150 to about 1250 degrees centigrade for from about 10 to 30 minutes until the glass becomes molten and flows over the surface of the substrate;

(f) reducing the temperature of the assembly to from about 950 to about 1,050 degrees centigrade; and

(g) maintaining the temperature of the assembly at from about 950 to about 1,050 degrees centigrade for from about 25 to about 60 minutes.

4,959,090

GLASS ENAMEL COATING COMPOSITIONS

Barry P. Reinherz, Lawrence, Pa., assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 250,460, Sep. 28, 1988, abandoned. This application Jul. 25, 1989, Ser. No. 386,033

Int. Cl.[5] C03C *17/04*

U.S. Cl. 65—60.4 **13 Claims**

1. In the method for forming a glass enamel coated glass sheet, the glass enamel composition comprising a glass frit system and a vehicle therefor, wherein the glass enamel composition is coated onto the glass sheet, the coated glass sheet is heated to soften the sheet, to remove the volatiles in said enamel and to bond the remainder of the enamel to the sheet, the softened glass sheet is contacted with a fibrous material covered forming die, the forming die is removed and the glass sheet is cooled; the improvement comprising incorporating into the enamel composition from about 2–75%, by weight, of a finely divided metal powder selected from the group consisting of chromium, chromium carbide, cobalt, copper, stainless steel, nickel, silicon, titanium, tungsten and tellurium metal powders and mixtures thereof.

4,959,091

METHOD FOR INCREASING THE YIELD OF CROPS

Atsuhiko Kumura, Chiba; Ryuichi Ishii, Tokyo; Bing-Shan Luo, Chiba; Meiro Adachi; Kenji Hamada, both of Kanagawa, and Fumio Fujita, Kanagawa, all of Japan, assignors to National Federation of Agricultural Co-Operative Associations and Nissan Chemical Industries, both of Tokyo, Japan

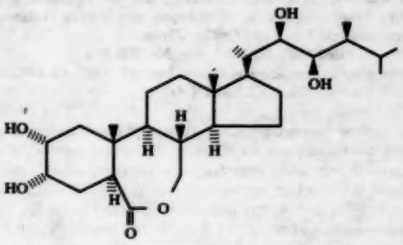
Filed Sep. 19, 1985, Ser. No. 777,746

Claims priority, application Japan, Sep. 20, 1984, 59-195658; May 31, 1985, 60-116537

Int. Cl.[5] A01N *43/22*

U.S. Cl. 71—77 **17 Claims**

1. A method for increasing the yield of crops, which comprises treating gramineous crops during a flower ripening period with an effective amount of (2α, 3α, 22R, 23R)-tetrahyroxy-24S-methyl-B-homo-7-oxa-5α-chloestan-6-one of the formula I:



(I)

4,959,092

SUBSTITUTED PHENYL (OR PYRIDYL) UREA COMPOUND AND HERBICIDAL COMPOSITION CONTAINING THE SAME AS ACTIVE INGREDIENT

Hiroki Obta, Kokubunji; Katsutoshi Sato, Machida; Susumu Matsumoto, Yokohama; Kazuo Ishii; Yumiko Miura, both of Tokyo; Hisao Watanabe, Yokohama; Seiichi Suzuki; Yoichiro Umeki, both of Tokyo, and Hiroshi Hanabe, Yokohama, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

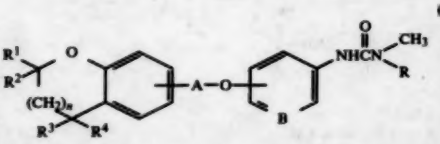
Filed May 25, 1988, Ser. No. 198,287

Claims priority, application Japan, Jun. 3, 1987, 62-139399; Dec. 11, 1987, 62-313718; Dec. 11, 1987, 62-313720; Dec. 14, 1987, 62-315858; Dec. 14, 1987, 63-315860

Int. Cl.[5] C07D *307/79*; A01N *43/12*

U.S. Cl. 71—88 **27 Claims**

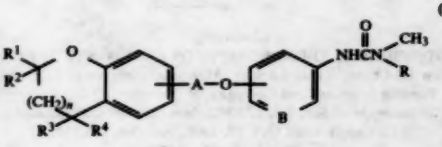
1. A compound represented by the following general formula (I):



(I)

wherein A represents an ethylene group or an isopropylene group; B represents a nitrogen atom or CH; R represents a hydrogen atom, a lower alkyl group or a lower alkoxy group; R^1, R^2, R^3 and R^4 independently represent a hydrogen atom or a methyl group; and n is 0 or 1.

19. A method of controlling the growth of weeds, which method comprises applying a herbicidally effective amount of compound represented by the following general formula:



(I)

wherein A represents an ethylene group or an isopropylene group; B represents a nitrogen atom or CH; R represents a hydrogen atom, a lower alkyl group or a lower alkoxy group; R^1, R^2, R^3 and R^4 independantly represent a hydrogen atom or a methyl group; and n is 0 or 1.

4,959,093

(22R,23R,24S)-22,23-EPOXY-2α3α-ISOPROPYLIDENE-DIOXY-B-HOMO-7-OXA-5α-STIGMASTAN-6-ONE AND PLANT GROWTH REGULATING METHOD CONTAINING THE SAME

Yasuo Kamura; Toshihito Kakiuchi, both of Tsukuba, and Suguru Takatsudo, Joetsu, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Filed Dec. 22, 1988, Ser. No. 288,563

Claims priority, application Japan, Dec. 24, 1987, 62-329228

Int. Cl.[5] A01N *43/30*

U.S. Cl. 71—88 **1 Claim**

1. A method for regulating the growth of plants comprising spraying onto said plant an effective regulating amount of a plant growth regulating composition comprising as an active ingredient, an effective regulating amount of (22R,23R,24S)-22,23-epoxy-2α,3α-isopropylidenedioxy-B-homo-7-oxa-5α-stigmastan-6-one and an agrochemically acceptable vehicle.

4,959,094

1-CHLOROPYRIMIDINYL-1H-1,2,4-TRIAZOLE-3-SULPHONAMIDES AS HERBICIDES

Peter Wegner; Martin Krüger; Gerhard Johann; Reinhart Rusch; Richard Rees, all of Berlin, Fed. Rep. of Germany; John Head, Stortford, and Graham Rowson, Hundon, both of England, assignors to Schering Aktiengesellschaft, Fed. Rep. of Germany

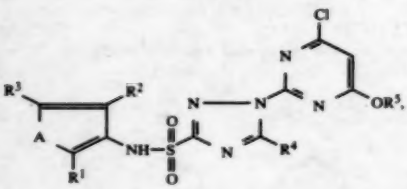
Filed Apr. 19, 1989, Ser. No. 340,484

Claims priority, application Fed. Rep. of Germany, Apr. 20, 1988, 3813885

Int. Cl.[5] C07D *403/04, 409/14*; A01N *43/54, 43/653*

U.S. Cl. 71—92 **16 Claims**

1. 1-Chloropyrimidinyl-1H-1,2,4-triazole-3-sulphonamide of formula I



(I)

in which

A is —S— or —CH=CH—;

R^1 is halogen, methyl, trifluoromethyl, methoxy, difluoromethoxy, nitro or methoxycarbonyl;

R^2 is hydrogen, halogen, methyl, methoxy, allyloxy or propargyloxy;

R^3 is hydrogen or methyl;

R^4 is hydrogen, methyl or methoxymethyl; and

R^5 is C_1–C_4-alkyl.

3. A method of combating weeds which comprises applying to the weeds or their locus a herbicidally effective amount of a compound according to claim 1.

4,959,095

HERBICIDAL O-CARBOMETHOXYSULFONYLUREA

Siew H. Chang, Kuala Lumpur, Malaysia, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 125,302, Nov. 25, 1987, abandoned. This application Oct. 19, 1988, Ser. No. 258,555

Int. Cl.[5] A01N *43/64*

U.S. Cl. 71—93 **4 Claims**

1. A method for controlling undesired weeds in plantation crops which comprises applying to the locus of the weeds a herbicidally effective amount of methyl 2-[[[[(4-methoxy-6-methyl-1,3,5-triazin-2-yl)amino]carbonyl]amino]sulfonyl]benzoate, the plantation crops selected from the group consisting of coffee, cocoa, oil palm, rubber, banana and citrus.

4,959,096

COMPOSITIONS FOR PROTECTING PLANTS AGAINST DISEASE

Helmut Zondler, Bottmingen, and Walter Kunz, Oberwil, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

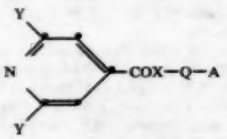
Filed Mar. 17, 1989, Ser. No. 324,876

Claims priority, application Switzerland, Mar. 25, 1988, 1140/88

Int. Cl.[5] A61K *31/455*; C07D *211/86*

U.S. Cl. 514—356 **8 Claims**

1. A compound of formula I



(I)

in which

Y is halogen;

X is oxygen or sulfur;

Q is C_1–C_3alkylene, propenylene, C_1–C_3alkylene mono- or di-substituted by R, or propenylene mono- or di-substituted by R;

R is C_1–C_4alkyl, C_1–C_4haloalkyl having from 1 to 3 halogen atoms, cyano, C_2–C_5alkoxycarbonyl, C_3–C_6cycloalkyl, phenyl, or phenyl substituted by C_1–C_4alkyl, C_1–C_4alkoxy, halogen, trifluoromethyl, trichloromethyl, nitro or by cyano, or benzoyl or benzoyl substituted by C_1–C_4alkyl, C_1–C_4alkoxy, trifluoromethyl, trichloromethyl, nitro or by cyano;

A is phenyl, biphenyl, phenoxyphenyl, naphthyl, pyridyl, furyl, thienyl, imidazolyl or triazolyl, each of these radicals being unsubstituted or substituted by halogen, C_1–C_4alkyl, C_1–C_3alkoxy, C_1–C_3haloalkoxy having from 1 to 3 halogen atoms, trifluoromethyl, nitro or by cyano; with the proviso (1) that if A is imidazolyl or triazolyl R may not be phenyl or benzoyl, and (2) that A and the R substituent in Q may together contain no more than 3 rings.

4,959,097

23-PHENYLSTEROIDS

Sei-ichi Hayashi; Tadashi Hohjoh, both of Saitama; Atsuhiko Shida, Ibaraki, and Nobuo Ikekawa, Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha and Taisa Biochemical Co., Ltd., both of Tokyo, Japan

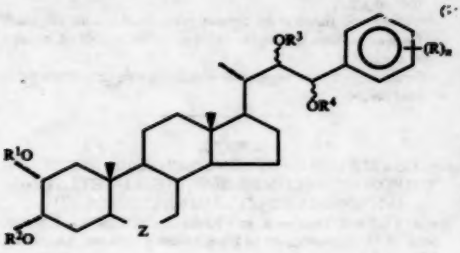
Division of Ser. No. 163,526, Mar. 3, 1988, Pat. No. 4,886,544. This application Oct. 4, 1989, Ser. No. 416,926

Claims priority, application Japan, Mar. 17, 1987, 62-59934

Int. Cl.[5] A01N *31/00*; C07J *9/00, 41/00*

U.S. Cl. 71—112 **5 Claims**

1. A steroidal compound represented by the formula:



wherein

Z represents

n represents an integer of 1 to 3,

R represents hydrogen, halogen, CF_3, lower alkyl, lower alkoxy or $—CO_2R'$, wherein R' represents hydrogen, alkali metal or lower alkyl, and

R^1, R^2, R^3 and R^4 represent hydrogen or acyl, respectively, with the proviso that when n is 2 or 3, R may represent substituents which may be independent each from one or more of the others.

4,959,098

N-SUBSTITUTED 3,4,5,6-TETRAHYDROPHTHALIMIDE DERIVATIVES

Barbara Schwalge, Ludwigshafen; Peter Plath, Frankenthal; Karl Eicken, Wachenheim; Lothar Rueb, Speyer; Bruno Wuerzer, Otterstadt; Karl-Otto Westphalen, Speyer, and Norbert Meyer, Ladenburg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

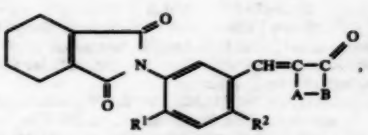
Filed Jun. 2, 1989, Ser. No. 360,864

Claims priority, application Fed. Rep. of Germany, Jun. 8, 1988, 3819464

Int. Cl.[5] A01N *43/36*; C07D *209/48*

U.S. Cl. 71—95 **9 Claims**

1. An N-aryltetrahydrophthalimide compound of the formula I



I

where R^1 is hydrogen or halogen, R^2 is halogen, A is a C_2–C_4-alkylene or C_2–C_4-alkenylene bridge which may carry from one to three C_1–C_3-alkyl groups and B is oxygen or sulfur.

4,959,099

TAPER ROLLING OF METAL

Alexander I. Wilson, Sheffield, England, assignor to Ian Wilson Technology Limited, Sheffield, England

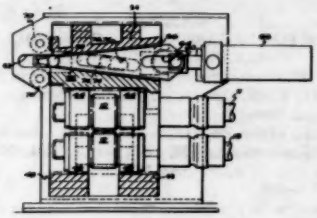
Filed Feb. 9, 1989, Ser. No. 308,835

Claims priority, application United Kingdom, Jan. 14, 1988, 8800792

Int. Cl.[5] B21B *31/30*

U.S. Cl. 72—244 **11 Claims**

1. Apparatus for the taper rolling of metal, the apparatus including at least a pair of main rolls mounted for rotation in a roll housing and defining a roll gap through which a workpiece blank can be drawn by a drawbar arrangement, control means being provided whereby, simultaneously, the spacing between the rolls can be varied in accordance with the linear movement of the workpiece, in which respective pairs of roll chocks for upper and lower rolls defining the roll gap are located by a mechanism for ensuring that the pass line remains at a fixed height throughout the rolling operation, said mechanism including a horizontally disposed wedge member having oppositely directed inclined surfaces constrained to move along a horizontal path under the influence of the control means, the roll chocks for one of the main rolls abutting against



one inclined surface of the wedge member and the roll chocks for the other of the main rolls being carried in a sash-like frame having upstanding slide plates of which are slidably mounted for vertical adjustment in the roll housing and a cross block of which abuts against the other inclined surface of the wedge member, whereby, despite the pairs of roll chocks not being located on opposite sides of the wedge member, one of the pair of roll chocks abuts against one inclined surface of said wedge member and the other pair of roll chocks in effect abuts against the other inclined surface of said wedge member so that movement of said wedge member along said horizontal path moves both said main rolls either towards or away from one another while maintaining said pass line at said fixed height.

4,959,100

RECOVERY OF NON-FERROUS METALS FROM DROSS

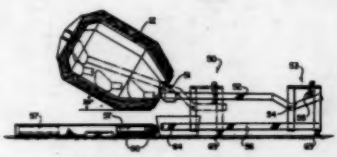
Ghyslain Dube; Jean-Paul Haui; Serge Lavole, and Wesley D. Stevens, all of Jonquiere, Canada, assignors to Alcan International Limited, Montreal, Canada

Continuation-in-part of Ser. No. 255,060, Oct. 7, 1988. This application Dec. 19, 1988, Ser. No. 286,386

Claims priority, application Canada, Dec. 22, 1987, 555114; Oct. 7, 1988, 579628

Int. Cl.[5] C22B *21/00*

U.S. Cl. 75—10.19 **54 Claims**



1. A process for recovering a non-ferrous metal from a dross containing the same, which comprises:

introducing the dross into a rotary furnace having a refractory lining;

heating the dross to a temperature above the melting point of the metal by directing a plasma torch into the furnace;

rotating the furnace in a manner selected from the group

consisting of continuous rotation and intermittent rotation;

removing the molten metal thereby separated from a solid dross residue; and

wherein the dross contains aluminum and wherein the plasma torch introduces different gases into the furnace at different stages of the heating of the dross according to the following scheme:

(a) start of heating (from about 20° C. : air

(b) when the aluminum becomes molten (about 660° C) : N_2

(c) when the dross is heated to about 850° C. : N_2

(d) when the temperature of dross rises from: Ar about 850° C. to about 1000° C. (without applied power).

4,959,101

PROCESS FOR DEGASSING ALUMINUM MELTS WITH SULFUR HEXAFLUORIDE

James R. MacNeal, Painesville; Timothy P. Rack, Solon, and Ronald R. Corns, Maumee, all of Ohio, assignors to AGA AB, Cleveland, Ohio

Continuation of Ser. No. 67,949, Jun. 29, 1987, abandoned. This application Sep. 28, 1988, Ser. No. 251,959

Int. Cl.[5] C22B *21/06*

U.S. Cl. 75—685 **11 Claims**

1. A process for purifying melts of aluminum alloys containing magnesium by removing solid particle impurities including aluminum oxides and gaseous impurities from the melt without substantially altering the concentration of the magnesium in the melt, comprising the step of bubbling through the melt a treating gas consisting of an inert gas containing gaseous sulfur hexafluoride in a concentration up to about 10 percent by volume sulfur hexafluoride in order to remove the gaseous impurities and the solid particle impurities from the melt to a surface thereof, thus leaving the melt in the purified condition.

4,959,102

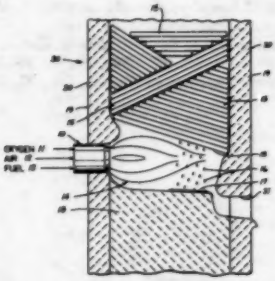
METHOD FOR MELTING AND REFINING COPPER METAL

James H. Clarkson; Kenneth R. Rhodes; Bruce E. Betterton, all of Carroll County, and Richard B. Foster, Coweta County, all of Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Mar. 8, 1989, Ser. No. 320,427

Int. Cl.[5] C22B *15/14*

U.S. Cl. 75—649 **12 Claims**



1. A method of melting and refining copper, said copper containing impurities, in a shaft furnace comprising the steps of:

providing a source of oxygen;

providing a source of air;

providing a source of fuel;

transferring measured quantities of said oxygen, air and fuel, from their respective sources, to a combustion point;

burning said oxygen, air, and fuel at said combustion point under conditions that will produce an oxidizing flame and free oxygen;

directing said flame onto copper contained within the shaft furnace so that the metal melts to form a pool of molten copper; and

refining said impure copper by oxidizing said impurities with said free oxygen.

4,959,103

CORROSION INHIBITING AQUEOUS, ACIDIC COMPOSITIONS COMPRISING METAL-CHELATING O-HYDROXYBENZYLAMINE COMPOUND

Walter O. Siegl, Dearborn, and Mohinder S. Chattha, Livonia, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

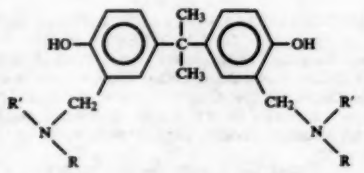
Division of Ser. No. 247,227, Sep. 21, 1988, Pat. No. 4,917,729, which is a division of Ser. No. 5,181, Jan. 20, 1987, Pat. No. 4,792,355. This application Aug. 9, 1989, Ser. No. 390,954

Int. Cl.[5] C23F *11/04*

U.S. Cl. 106—14.16 **9 Claims**

1. A method for inhibiting corrosion of a corrodible metal substrate, said method comprising:

contacting said metal substrate with an acidic, aqueous composition having a pH between about 2 and about 6 and consisting essentially of at least about 0.01 weight percent of water-soluble or water-dispersible metal-chelating compound, for a time sufficient to deposit a corrosion preventative coating comprising water-insoluble metal-chelate compound, wherein said metal-chelating compound is selected from compounds having the general chemical formula:



wherein R is selected from hydroxy ethyl and hydroxy propyl moieties which may be substituted with non-interfering functionality and R' is H, alkyl, aryl or hydroxy alkyl.

4,959,104

SELF-HARDENABLE MATERIAL

Shinji Iino; Minoru Oshima, both of Yamaguchi; Shinya Kitoh, Kanagawa, and Toshiaki Kobayashi, Kanagawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc. and Lion Corporation, both of Tokyo, Japan

Continuation of Ser. No. 916,603, Oct. 8, 1986, abandoned. This application Dec. 20, 1988, Ser. No. 287,695

Claims priority, application Japan, Oct. 11, 1985, 60-226357

Int. Cl.[5] C04B *12/02*

U.S. Cl. 106—85 **8 Claims**

1. A self-hardenable material consisting essentially of calcium phosphate having a g atom ratio of Ca/P of 1.3 to 2.0, a difficultly water-soluble inorganic fluoride, an acid and water, the ratio of said calcium phosphate to said difficultly water-soluble fluoride being within the range of g atom ratio of Ca/F of 4.2 to 60, said acid being included in a ratio of 2×10^{-5} mol/g to 1.2×10^{-3} mol/g relative to calcium phosphate, said water being within a mole ratio of H_2O/PO_4 of $\frac{1}{3}$ to 50, said acid being selected from the group consisting of organic acids of formic acid, acetic acid, propionic acid, glycolic acid, lactic acid, citric acid, saccharic acid, ascorbic acid, glutamic acid, asparagic acid, oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, pyrubic acid, acetoacetic acid, levulinic acid, salicylic acid, benzoic acid, phthalic acid and their alkali metal,

alkaline earth metal or ammonium salts, and their acid anhydrides or acid chlorides; and inorganic acids and their alkali metal, alkaline earth metal or ammonium salts, and said calcium phosphate being capable of converting to fluorospatite on hardening.

6. A fluoro-apatite hardened product obtained by hardening a composition consisting essentially of calcium phosphate having a g atom ratio of Ca/P of 1.3 to 2.0, a difficultly water-soluble inorganic fluoride, an acid and water, the ratio of said calcium phosphate to said difficultly water-soluble fluoride being within the range of g atom ratio of Ca/F of 4.2 to 60, said acid being included in a ratio of 2×10^{-5} mol/g to 1.2×10^{-3} mol/g relative to calcium phosphate, said water being within a mole ratio of H_2O/PO_4 of $\frac{1}{3}$ to 50, said acid being selected from the group consisting of organic acids of formic acid, acetic acid, propionic acid, glycolic acid, lactic acid, citric acid, saccharic acid, ascorbic acid, glutamic acid, asparagic acid, oxalic acid, malonic acid, succinic acid, glutaric acid, adipic acid, pyrubic acid, acetoacetic acid, levulinic acid, salicylic acid, benzoic acid, phthalic acid and their alkali metal, alkaline earth metal or ammonium salts, and their acid anhydrides or acid chlorides; and inorganic acids and their alkali metal, alkaline earth metal or ammonium salts.

4,959,105

ALUMINIUM CLEANING COMPOSITION AND PROCESS

Fred Neidiffer, P.O. Box 2497, Capistrano Beach, Calif. 92624; Charles E. Fox, and Patsy E. Fox, both of Rte. #1, Box 87, Durant, Iowa 52747

Continuation-in-part of Ser. No. 251,299, Sep. 30, 1988. This application Mar. 14, 1990, Ser. No. 493,415

Int. Cl.[5] B08B *3/08*

U.S. Cl. 134—3 **22 Claims**

16. A process for cleaning debris from the surface of an aluminum-containing article comprising:

contacting a debris-laden aluminum containing article with a composition at conditions effective to do at least one of the following: (1) remove at least a portion of said debris from said aluminum-containing article and (2) condition at least a portion of said debris for removal from said aluminum containing article, said composition comprising water; at least one polycarboxylic acid component selected from the group consisting of polycarboxylic acids, salts of polycarboxylic acids and mixtures thereof; at least one acidic component in an amount effective to increase the solubility of said polycarboxylic acid component in said composition; and at least one acid acting enzyme in an amount effective to at least facilitate the removal of debris from said aluminum-containing article; and

recovering said aluminum-containing article having at least a portion of said debris removed therefrom.

4,959,106

PHOTOVOLTAIC ELEMENT WITH A SEMICONDUCTOR LAYER COMPRISING NON-SINGLE CRYSTAL MATERIAL CONTAINING AT LEAST ZN, SE AND H IN AN AMOUNT OF 1 TO 4 ATOMIC %

Katsumi Nakagawa, Nagahama; Masahiro Kanai, Tokyo; Shunichi Ishihara; Kozo Arao, both of Hikone; Yasushi Fujioka, Nagahama; Akira Sakai, Nagahama, and Tsutomu Murakami, Nagahama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

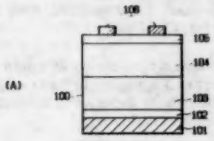
Continuation of Ser. No. 222,093, Jul. 20, 1988, abandoned. This application Aug. 28, 1989, Ser. No. 399,396

Claims priority, application Japan, Jul. 21, 1987, 62-179927; Aug. 19, 1987, 62-205916; Aug. 19, 1987, 62-205917

Int. Cl.[5] H01L *31/06, 31/0392, 31/0368*

U.S. Cl. 136—258 **9 Claims**

1. A photovoltaic element which generates photoelectromotive force by the contact of a p-type semiconductor layer with an n-type semiconductor layer, characterized in that one of said semiconductor layers is a film composed of zinc atoms, selenium atoms, and at least hydrogen atoms, said film containing a p-type or n-type doping agent, containing 1 to 4 atomic% of hydrogen atoms, and also containing crystal grains in a ratio of 65 to 85 vol% per unit volume, and the other of said semi-



conductor layers is film represented by the general formula ZnA, where A denotes an oxygen atom, sulfur atom, or selenium atom, or any one of the general formulas ZnTe, $ZnSe_{1-y}Te_y$ (where $0<y<1$), and CdTe.

4,959,107

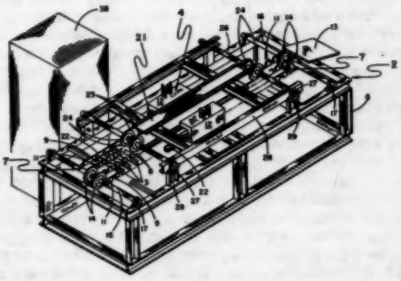
METHOD AND APPARATUS FOR TREATING LADDER RUNGS FOR FORMING ASSEMBLY WITH LADDER RAILS

Claude R. Wallick, Jr.; Thomas J. Schmitt, both of Jefferson, Ky.; Bruce E. Bogart, Floyd, Ind., and John L. Krebs, Washington, Wis., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Apr. 3, 1989, Ser. No. 331,822

Int. Cl.[5] C22F *1/04*

U.S. Cl. 148—13 **35 Claims**



1. A method of treating ladder rungs for subsequent forming assembly with ladder rails comprising:

moving a plurality of ladder rungs with their longitudinal axis in selected spaced parallel relation in a path having the longitudinal axis thereof extending substantially normal to said longitudinal axis of said rungs and adjacent a longitudinally extending through passage hearing zone so that only preselected areas of said rungs pass through said heating zone through passage; and,

controlling the residence time of movement and heated temperature of said preselected rung areas as they pass through said through passage heating zone to selectively soften said preselected rung areas to a state of desired forming hardness in accordance with the physical properties of said rungs without melting said rungs and without changing the physical properties of the remaining areas of the rungs.

4,959,108

EXPLOSIVE COMPOSITIONS AND METHOD UTILIZING BULKING AND GASSING AGENTS

Kevin H. Waldock, Wales, Australia, assignor to Submarine and Surface Blaster Pty. Limited, Mount Thorley, Australia

Filed May 26, 1989, Ser. No. 357,282
Claims priority, application Australia, May 26, 1988, PI8506
Int. Cl.[5] C06B *45/00*
U.S. Cl. 149—2 **10 Claims**

1. A method of preparing an explosive composition, comprising adding an inert bulking agent to said composition so as to increase weight and density thereof and thereafter introducing gas so as to decrease said density.

4,959,109

APPARATUS AND PROCESS FOR PREPARING BELTS

Eugene A. Swain, Webster, N.Y.; Marvin Menzin, Lexington, Mass.; Edward A. Agranat, Weston, Mass.; Henry R. Cofek, Westford, Mass., and Daniel J. Fisher, Chelmsford, Mass., assignors to Xerox Corporation, Stamford, Conn.

Continuation of Ser. No. 845,205, Mar. 27, 1986, abandoned.
This application Jun. 30, 1989, Ser. No. 374,598
Int. Cl.[5] B32B *31/18*
U.S. Cl. 156—73.4 **20 Claims**

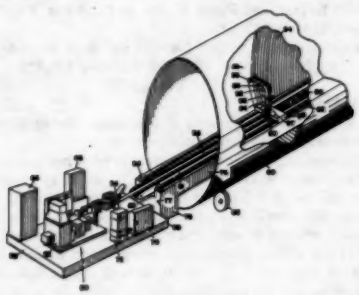
1. Apparatus for fabricating electrostatographic imaging belts comprising a wrapping station, a welding station, at least a first rotatable mandrel and a second rotatable mandrel, said first rotatable mandrel and said second rotatable mandrel each comprising a cylinder having at least one first opening or one first series of openings extending axially along said outer surface of said cylinder and at least one second opening or second series of openings extending axially along said outer surface of said cylinder, said second opening or second series of openings being adjacent to and circumferentially spaced on said cylinder from said first opening or first series of openings, means to support said first rotatable mandrel, means to support said second rotatable mandrel, transporting means for conveying rotatable mandrels to and from said wrapping station and said welding station along an arc of a circular path lying in an imaginary plane extending through and parallel to the axis of said first rotatable mandrel and said second rotatable mandrel, said axis of said first rotatable mandrel and said second rotatable mandrel each being substantially perpendicular to imaginary lines radially emanating from the center of said circular path, said welding station comprising a welding means, means for supplying the leading edge of a web from a web supply roll to said wrapping station, said transporting means being adapted to position the axis of said first rotatable mandrel parallel to said leading edge of said web at said wrapping station, pick up means adapted to grip only said leading edge and position said leading edge of said web on and parallel to said first opening or first series of openings on said first rotatable mandrel conveyed to said wrapping station by said transporting means, means to form a partial vacuum within said first opening or first series of openings to secure said leading edge of said web on said first rotatable mandrel, means to rotate said first rotatable mandrel at said wrapping station about one revolution whereby said web is wrapped around said first rotatable mandrel, means to sever said web to form a trailing edge whereby said trailing edge of said web on said first rotatable mandrel at said wrapping station overlaps said leading edge of said web to form a first belt having a seam, means to form a partial vacuum within said second opening or second series of openings to secure the area of said web adjacent said trailing edge to said first rotatable mandrel, means to activate said transporting means to simultaneously convey said first rotatable mandrel wrapped with said first belt having said seam to said welding station and convey said second rotatable mandrel to said wrapping station for wrapping with a second belt, and means to weld said seam on said first belt at said welding station at substantially the same time as said second rotatable mandrel is wrapped at said wrapping station with said second belt.

4,959,110

METHOD FOR LINING THE INNER SURFACE OF A CYLINDRICAL OR DOMED CYLINDRICAL MEMBER WITH AN ELASTOMERIC MATERIAL

Peter G. Russell, Ogden, Utah, assignor to Morton Thiokol Inc., Chicago, Ill.

Filed May 11, 1988, Ser. No. 193,309
Int. Cl.[5] B29C *53/58, 63/08*
U.S. Cl. 156—187 **8 Claims**



1. A method for lining the inner surface of a generally cylindrical member with an elastomeric material comprises the steps of:

a. rotating the generally cylindrical member about its rotational axis;

b. providing within the generally cylindrical member a head for applying a continuous strip of tacky elastomeric material to the inner surface of the generally cylindrical member as it rotates;

c. transporting a continuous strip of tacky elastomeric material to the head for application to the inner surface of the generally cylindrical member as it rotates;

d. applying the strip of tacky elastomeric material to the inner surface of the generally cylindrical member as it rotates;

e. moving the head axially as the strip is applied to form a layer of elastomeric material over the inner surface of the generally cylindrical member;

f. removing the head from within the generally cylindrical member; and

g. curing the applied elastomeric material,

the method further comprises providing an elevated platform which extends axially through the generally cylindrical member, providing a support member for the head, moving the support member axially along said platform, and conveying the elastomeric strip to said head from outside the generally cylindrical member.

4,959,111

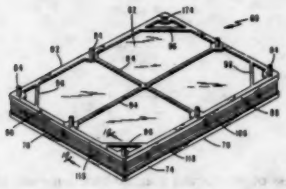
HEAVY GAS-FILLED MULTILAYER INSULATION PANELS AND METHOD OF MANUFACTURE THEREOF

Richard W. Kruck, Sodus Township, Berrien County, and Omer N. Cur, St. Joseph Township, Berrien County, both of Mich., assignors to Whirlpool Corporation, Benton Harbor, Mich.

Division of Ser. No. 897,978, Aug. 19, 1986, Pat. No. 4,808,457. This application Nov. 4, 1988, Ser. No. 267,330

Int. Cl.[5] B32B *31/10*; F25D *23/06*

U.S. Cl. 156—145 7 Claims



1. A method of manufacturing a self-contained, gas-filled, thermal insulation panel which is characterized by having a first transverse frame member with a plurality of orthogonal extensions on one side thereof for locating and retaining an alternating succession of parallel thin sheets each provided with sheet apertures disposed in correspondence with said extensions and interlocking peripheral gaskets each provided with gasket apertures in correspondence with the sheet apertures to form thin transversely extensive gas-filled cavities, and a second transverse frame member provided with frame apertures disposed in correspondence with said extension of the first frame member and thus affixable to the extensions, with the framed assembly thus formed being contained in a hermetically sealed envelope forming the outer skin of the panel, comprising the steps of:

locating a first thin sheet by receiving said extensions of said first transverse member through said sheet apertures of the first thin sheet for location and stretched out retention of the first thin sheet thereby on said first transverse frame member;

locating a gasket on said first thin sheet for retention on said first transverse frame member with said extensions received through the gasket apertures, and applying a force to said gasket to interlock said first gasket with said first frame member to firmly grip and securely stretch said first thin sheet therebetween;

repeating the preceding two steps for locating successive thin sheets and interlocking successive gaskets each with a previously located gasket, until a desired number of unsealed cavities thus formed between adjacent thin sheets is obtained;

locating said second frame member by receiving said extensions through said frame apertures, in interlocking relationship with the last located gasket therebelow to firmly grip the last located thin sheet thereon;

affixing said second frame member to said received orthogonal extensions of said first frame member to form said framed assembly;

filling said cavities with a heavier-than-air gas; and

enveloping said framed assembly in a hermetically sealed envelope to retain said gas within said cavities.

4,959,112

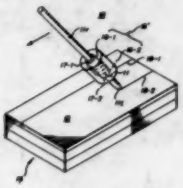
SELECTIVE SCRIBING OF MATERIALS

Frank B. Ellis, Jr., Princeton; Alan E. Delahdy, Rocky Hill; Jonathan Allen, Titusville, and Hermann Volltrauer, Englishtown, all of N.J., assignors to Chronar Corp., Lawrenceville, N.J.

Continuation-in-part of Ser. No. 671,199, Nov. 14, 1984, abandoned. This application Jan. 21, 1987, Ser. No. 5,616

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—248 16 Claims



1. The method of patterning the surface of a conductive material which comprises the steps of

(a) bringing a heated and rounded tip into contact with the surface of said material;

(b) moving said heated and rounded tip over said material in contact therewith in accordance with a prescribed pattern to produce a line of separation of said material along said surface; and

(c) applying a momentary voltage to straddle said line of separation and eliminate any shards therealong.

4,959,113

METHOD AND COMPOSITION FOR POLISHING METAL SURFACES

John V. H. Roberts, Newark, Del., assignor to Rodel, Inc., Newark, Del.

Filed Jul. 31, 1989, Ser. No. 387,474

Int. Cl.[5] B44C *1/22*; C23F *1/00*; C03C *15/06*, *25/06*

U.S. Cl. 156—636 20 Claims

1. A method for polishing a metal surface comprising

(a) providing an aqueous polishing composition comprising water, an abrasive agent and a salt, wherein the salt is the reaction product of a reaction selected from the group consisting of a reaction between an acid and a base and a reaction between an acid and a metal, wherein the salt includes a cationic component and an anionic component, the cationic component being selected from the group consisting of ionized elements which will not deposit by electroless plating on the metal surface being polished;

(b) applying the composition to a metal surface to be polished; and

(c) polishing the metal surface.

4,959,114

PROCESS FOR PRODUCING FLATTENED GUSSETED TUBING FROM FLAT PLASTIC FILM

Friedhelm Mundus, Lengerich, Fed. Rep. of Germany, assignor to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed Jun. 21, 1989, Ser. No. 368,720

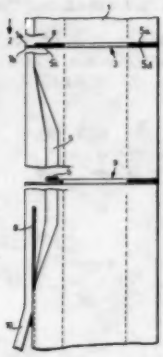
Claims priority, application Fed. Rep. of Germany, Jun. 21, 1988, 3820941

Int. Cl.[5] B32B *31/16*

U.S. Cl. 156—204 3 Claims

1. A process for producing flattened gusseted tubing from a flat continuous film of synthetic thermoplastic which comprises forming lengthwise edge gussets in the film with lateral marginal portions of the film being superposed adjacent to an outer edge of a covering gusset of the film, reversely folding a

portion of the covering gusset in on itself, providing the marginal portions with a longitudinal seam weld in a region of the film which in plan view was substantially aligned with an outer



edge of the covering gusset before the gusset was reversely folded, and then unfolding the reversely folded portion of the gusset.

4,959,115

METHOD OF PRODUCING BLOCKS OF SELF-ADHESIVE LABELS OR THE LIKE AND OF APPLYING THE LABELS TO A BODY

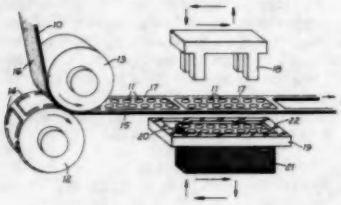
Robert M. Lacy, 76 The Wynding, Bedlington, Northumberland, England (NE22 6HW)

Filed Dec. 21, 1988, Ser. No. 287,499

Claims priority, application United Kingdom, Dec. 23, 1987, 8729929

Int. Cl.[5] B32B *31/18*

U.S. Cl. 156—264 **18 Claims**



1. A method of producing blocks of self-adhesive products, which method comprises feeding continuously to a cutting device a continuous flexible web having on a first face thereof a multiplicity of repeated images overlaid by a release coating and further having on a second face thereof a pressure-sensitive adhesive coating, cutting from the web a succession of cut sheets each having at least two said images thereon, forming a stack of superimposed cut sheets, and subsequently cutting said stack to form at least two blocks of superimposed self-adhesive products, each said product having a single said image thereon.

4,959,116

PRODUCTION OF METAL BASE LAMINATE PLATE INCLUDING APPLYING AN INSULATOR FILM BY POWDER COATING

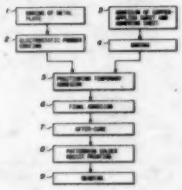
Masato Tsuji, Iwaki, Japan, assignor to Alps Electric Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1989, Ser. No. 307,862

Claims priority, application Japan, Mar. 24, 1988, 63-68201

Int. Cl.[5] B29C *65/18, 65/52*

U.S. Cl. 156—283 **3 Claims**



1. A process of producing a metal base laminate plate, comprising the steps of applying an insulator film by powder coating to a metal plate having a through-hole formed therein to form a metal base plate, placing a film base plate having a heat resisting property in position on said metal base plate with a thermosetting adhering sheet interposed therebetween to form a layered body, pressurizing and heating only part of said layered body to temporarily adhere said metal base plate and said film base plate to each other, and introducing said layered body in a predetermined orientation into a pair of pressuring and heating rollers to finally adhere said metal base plate and said film base plate to each other.

4,959,117

APPARATUS FOR THE PRESSING OF LAMINATED GLASS/PLASTIC COMPOSITES

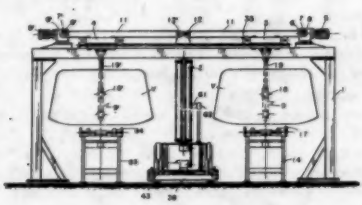
Vittore De Leonibus, and Carmine Pascale, both of Vasto, Italy, assignors to Societa Italiana Vetro - SIV S.p.A., San Salvo, Italy

Filed Oct. 31, 1988, Ser. No. 264,881

Claims priority, application Italy, Nov. 5, 1987, 48579 A/87

Int. Cl.[5] B30B *3/04, 15/30, 15/32*

U.S. Cl. 156—497 **13 Claims**



1. An apparatus for pressing a laminated glass/plastic composite having side wings sharply bent in a direction of concavity of said glass/plastic composite, comprising a press device rotatable about a substantially vertical axis for pressing said glass/plastic composite, means for moving said glass/plastic composite from a substantially horizontal delivery position to said press device, and means for moving said glass/plastic composite from said press device after said glass/plastic composite has been pressed, wherein:

each said means for moving said glass/plastic composite

includes a vertically disposed suction cup unit and a vertical supporting shaft supporting said suction cup unit;

each said suction cup unit being rotatable about a vertical axis of said respective supporting shaft, whereby said glass/plastic composite can be moved to said press device to enter said press device in a substantially vertical position and at a predetermined entry angle, and moved from said press device in said substantially vertical position.

4,959,118

APPARATUS FOR APPLYING A PROTECTIVE FILM ON ONE FACE OF A SERIES OF OPHTHALMIC LENSES

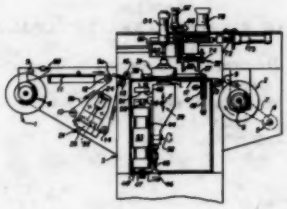
Patrick Herbin, Morlaincourt, and Jean-Claude Lacroix, Ligny-en-Barrois, both of France, assignors to Essilor International (Compagnie Generale d'Optique), Creteil, France

Division of Ser. No. 173,291, Mar. 25, 1988, Pat. No. 4,826,548. This application Feb. 2, 1989, Ser. No. 305,091

Claims priority, application France, Mar. 30, 1987, 87 04375

Int. Cl.[5] B32B *31/00*

U.S. Cl. 156—512 **9 Claims**



1. Apparatus for sticking a protective film on a face of a series of ophthalmic lenses, said apparatus comprising:

(a) a pay-out spool carrying a roll of composite tape comprising an adhesive tape having an adhesive face and a strippable backing tape covering said adhesive face;

(b) a first set of guide rolls for guiding the composite tape along a predetermined path;

(c) a second set of guide rolls for guiding the strippable backing tape of the composite tape along a loop path going away from said predetermined path and returning thereto;

(d) a punch device placed on said loop path for punching a series of holes in the strippable backing tape, said series of holes having a predetermined diameter greater than a lens diameter of said series of ophthalmic lenses, whereby, after the punched strippable backing tape and the adhesive tape are brought together downstream of said loop path, each hole in the punched strippable backing tape leaves a round portion of the adhesive face of the adhesive tape exposed;

(e) a lens support situated on one side of the predetermined path of the composite tape adjacent to the punched strippable backing tape and downstream from said loop path;

(f) a thrust buffer situated on the other side of said predetermined path and in register with the lens support;

(g) at least one of said lens support and said thrust buffer being mounted to move perpendicularly to said predetermined path;

(h) at least one actuator means connected to one of said lens support and said thrust buffer for pressing the composite tape therebetween and for applying the exposed round portion of the adhesive face of the adhesive tape through a hole in the punched strippable backing tape onto a lens carried by the lens support;

(i) a cutting device situated on said predetermined path of the composite tape downstream from the loop path for cutting out from the adhesive tape the round portion thereof which has adhered to the lens; and

(j) drive means acting on the composite tape in order to displace it along said predetermined path.

4,959,119

METHOD FOR FORMING THROUGH HOLES IN A POLYIMIDE SUBSTRATE

Thomas D. Lantzer, Fuquay-Varina, N.C., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 29, 1989, Ser. No. 443,301

Int. Cl.[5] B44C *1/22*; C23F *1/02*; C03C *15/00*; B29C *37/00*

U.S. Cl. 156—644 **2 Claims**

1. A method of forming at least one through hole with an electrically conductive wall in a polyimide substrate to connect electrically conductive surface portions on opposite sides of the substrate with an initial step of forming at least one hole in the substrate by employment of a carbon dioxide laser for polyimide removal wherein

(a) the carbon dioxide laser is employed at an average energy density in a range of from 18,000 to 45,000 watts per square inch,

(b) a predominant oxygen containing atmosphere is present,

(c) a carbon dioxide laser beam is defocussed in polyimide removal,

(d) a portion of the carbon dioxide beam passes through the polyimide substrate prior to complete hole formation onto a reflective surface which deflects at least 70% of the beam striking the reflective surface into the polyimide substrate to aid in hole formation, and

(e) relative motion is present between the laser source and the polyimide substrate for at least a portion of the hole formation.

4,959,120

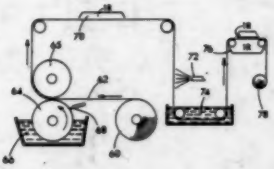
DEMETALLIZATION OF METAL FILMS

David Wilson, Mississauga, Canada, assignor to Golden Valley Microwave Foods, Inc., Edina, Minn.

Filed Jun. 21, 1989, Ser. No. 369,193

Int. Cl.[5] B44C *1/22*; C23F *1/02*; C05C *15/00, 25/06*

U.S. Cl. 156—651 **14 Claims**



1. A process to produce a metal coated article having a metal film with gradations in light transmission thereon, said method comprising, providing a nonconductive substrate having a thin metal film thereon, removing different amounts of the metal film from different portions of the substrate to provide differences in the amount of metal film remaining in the different portions thereof whereby the different portions of the metal film exhibit differences in optical density.

4,959,121

METHOD FOR TREATING A POLYIMIDE SURFACE FOR SUBSEQUENT PLATING THEREON

William V. Dumas, Essex Junction, Vt., and Donald F. Foust, Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 5, 1990, Ser. No. 461,579

Int. Cl.[5] B44C *1/22*; B29C *37/00*; C03C *15/00, 25/06*

U.S. Cl. 156—668 **18 Claims**

1. A method for pretreating a polyimide surface in prepara-

tion for an adhesion promotion treatment and subsequent metallization on the surface, comprising the steps of:

(A) contacting the polyimide surface with an aqueous solution of nitric acid having a concentration of about 35 to about 70% by weight or an aqueous solution of hydrochloric acid having a concentration of about 10 to about 38% by weight;

(B) rinsing the acid-treated polyimide surface with water so as to substantially remove the acid from the surface of the polyimide;

(C) contacting the rinsed polyimide surface with a mild etching agent, resulting in the formation of a residual film on the polyimide surface;

(D) contacting the etched polyimide surface with a basic solution, and

(E) removing the residual film formed on the surface of the polyimide after contact with the mild etching agent in step (C).

4,959,122

APPARATUS FOR TREATING PHOTOGRAPHIC PROCESS WASTE LIQUOR

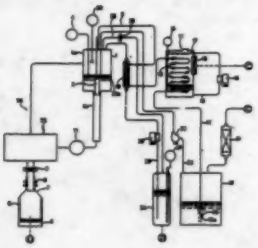
Masayuki Kuramatsu; Shigeharu Koboshi; Nobutaka Goto, and Naoki Takabayashi, all of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Oct. 26, 1988, Ser. No. 262,965

Claims priority, application Japan, Nov. 1, 1987, 62-276414; Nov. 29, 1987, 62-301363; Nov. 29, 1987, 62-301364

Int. Cl.[5] B01D *1/00, 35/00*

U.S. Cl. 159—42 **9 Claims**



1. An apparatus for treating a photographic process waste liquid comprising an evaporating means wherein the photographic process waste liquor is concentrated by evaporation;

heating means for heating said waste liquor with the formation of a precipitate;

a precipitate separating means for separating the precipitate from the concentrated waste liquor;

a circulation system to feed the concentrated waste liquor through the precipitate separating means and thereafter return said concentrated waste liquor to the evaporating means; and

a discharging means for discharging the precipitate separated at said precipitate separating means from said precipitate separating means;

wherein the evaporating means is provided with a taper-shaped section for immediate removal of precipitate so that thermal decomposition of the precipitate and generation of undesirable odors is avoided.

4,959,123

PROCESS FOR DEINKING PRINTED WASTE PAPER

Klaus Lehmann; Andreas Domsch, both of Illertissen, and Hans Hawel, Voehringen, all of Fed. Rep. of Germany, assignors to Chemische Fabrik Gruenau GmbH, Illertissen, Fed. Rep. of Germany

Filed Feb. 2, 1988, Ser. No. 151,387

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1987, 3702978

Int. Cl.[5] D12C *5/02*

U.S. Cl. 162—5 **12 Claims**

1. In a process for deinking printing waste paper pulp by treatment of the pulp with an alkaline solution containing an alkali metal silicate, an oxidative bleach, a dispersant, and either a higher fatty acid, a resinic acid or a mixture thereof, followed by separation of the resulting detached printing ink particles from the pulp fiber suspension by flotation, the improvement wherein the higher fatty acid, resinic acid, or mixture thereof is added to the solution in the form of a finely divided alkaline earth metal salt in an oil-in-water dispersion which is liquid at room temperatures.

4,959,124

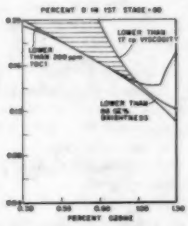
METHOD OF BLEACHING KRAFT PULP IN A DZED SEQUENCE

Ted Y. Tsai, Harriman, N.Y., assignor to International Paper Company, Tuxedo, N.Y.

Filed May 5, 1989, Ser. No. 348,606

Int. Cl.[5] D21C *9/14, 9/153*

U.S. Cl. 162—65 **6 Claims**



1. A method for the bleaching of cellulosic kraft pulp for use in making a paper comprising a bleaching sequence which includes not more than four stages including chlorine dioxide bleaching as the first stage, ozone bleaching as the second stage, wherein the pulp is passed directly from the chlorine dioxide bleaching stage to the ozone bleaching stage without an intervening extraction stage, an alkaline extraction as the third stage, and chlorine dioxide bleaching as the final stage, said stages being carried out in the order listed, said first stage chlorination being at a chlorination factor of between about 0.04 and about 0.22% based on oven-dried pulp and the quantity of ozone employed in said second stage being between about 0.3% and about 1.1% based on oven-dried pulp, to thereby produce a pulp that contains less than about 200 ppm total organic chlorine and which exhibits a G. E. brightness in excess of about 80%.

4,959,125

SOFT TISSUE PAPER CONTAINING NONCATIONIC SURFACTANT

Wolfgang U. Spendel, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed Dec. 5, 1988, Ser. No. 280,119

Int. Cl.[5] D21F *9/02;* D21H *5/24*

U.S. Cl. 162—158 **5 Claims**

1. Tissue paper having a basis weight of from about 10 to

about 65 grams per square meter, and density of about 0.6 grams or less per cubic centimeter, said paper comprising cellulosic fibers, an effective amount of an alkyl glycoside surfactant, said effective amount of alkyl glycoside surfactant being from about 0.01% to about 2.0% alkyl glycoside surfactant based on the dry fiber weight of said tissue paper, and an effective amount of a starch binder material, said effective amount of starch being from about 0.01% to about 2.0% based on the dry fiber weight of said tissue paper.

4,959,126

PROCESS FOR DECOKING A DELAYED COKER

Wuwei Tong, LuoYang; Deyu Sun, ShenYang; Qingyuan Zhang, LuoYang; Lielai Wu, LuoYang; Shicheng Zhou, LuoYang; Shande Yu, Shanghai; Daoji Du, and Shili Yang, both of LuoYang, all of China, assignors to LuoYang Petrochemical Engineering Corporation SINOPEC (LPEC), LiTun, LongMenZhen, LuoYang, China and Institut Francais du Petrole, Rueil Malmaison, France

Filed May 25, 1988, Ser. No. 198,809

Claims priority, application China, May 25, 1987, 87103735; Apr. 25, 1988, 88102514.3

Int. Cl.[5] C10B *33/00*

U.S. Cl. 201—2 11 Claims

1. A process for decoking at least one residual oil delayed coke reactor comprising:

pumping water at high pressure through a flexible pipeline suspended vertically with respect to the reactor by channeling the water through a path passing axially through an axis of a hollow drive shaft of a reel around which the flexible pipeline is looped and then channeling the water radially of the drive shaft and into a first end of the flexible pipeline;

ejecting the water from a nozzle array connected to a second end of the flexible pipeline in a downward direction with respect to the axis of the reactor at a first pressure while unreeling the flexible pipeline from the reel to drill a hole through the coke in the coke reactor;

changing the water pressure from a first pressure to a second pressure; and

ejecting the water from the nozzle array in a lateral direction at the second pressure to cut and discharge coke lining the bore from the reactor while reeling the flexible pipeline on the reel.

4,959,127

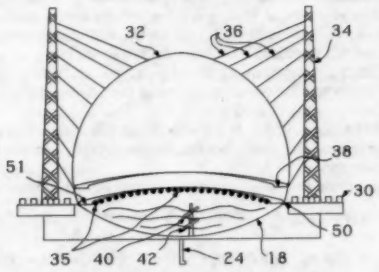
SYSTEM FOR DESALINIZATION OF SALTWATER

Claus G. Michna, 4 Toby La., Brookfield Center, Conn. 06805

Continuation-in-part of Ser. No. 904,542, Sep. 8, 1986, abandoned. This application Jun. 22, 1987, Ser. No. 64,400

Int. Cl.[5] C02F *1/14*

U.S. Cl. 202—177 4 Claims



1. A system for desalinating saltwater comprising:

an anchored platform container having an opening, a saltwater input valve and a fresh water output valve, wherein said platform container has a honeycomb wavebreaker therein to stabilize the level of the saltwater therein and thereby prevent the container from capsizing; a pan positioned in said opening including a first gutter, which surrounds said pan, spray nozzles attached thereto to both clean said pan and fill said pan with saltwater, and level sensor means for controlling the level of saltwater in said pan;

A preheating coil surrounding said platform container for preheating saltwater before it enters said platform container; and

a supported, collapsible plastic dome skin covering the opening of said platform container, said dome skin consists of skin sections of outer and inner plastic layers fused to a wire mesh sandwiched therebetween, whereby a single wire mesh reinforced skin is formed, and whereby solar ray heat is transmitted through the plastic dome and maintained within said dome to raise the temperature therein sufficiently higher than the temperature outside said dome to vaporize the saltwater and condense therefrom fresh water.

4,959,128

SEPARATION OF STYRENE FROM ETHYL BENZENE BY EXTRACTIVE DISTILLATION

Lloyd Berg, 1314 S. Third Ave., Bozeman, Mont. 59715, assignor to Lloyd Berg, Bozeman, Mont.

Filed Feb. 26, 1990, Ser. No. 484,613

Int. Cl.[5] B01D *3/40*; C07C *7/08*

U.S. Cl. 203—57 1 Claim

1. A method for recovering ethyl benzene from mixtures of ethyl benzene and styrene which comprises distilling a mixture of ethyl benzene and styrene in a rectification column in the presence of about one part of an extractive agent per part of ethyl benzene—styrene mixture, recovering ethyl benzene as overhead and styrene and the extractive agent from the still-pot, wherein said extractive agent is one member selected from the group consisting of adiponitrile, 1,5-dicyanopentane, methyl glutaronitrile, nitrobenzene, 2-nitrotoluene and 3-nitrotoluene.

4,959,129

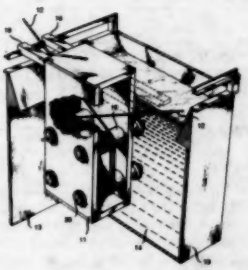
CONTINUOUS PLATING METHOD AND APPARATUS

Harold E. Fuchs, and Robert E. McAnany, both of Kansas City, Mo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 23, 1989, Ser. No. 355,708

Int. Cl.[5] C25D *7/06*, *17/00*

U.S. Cl. 204—28 16 Claims



1. A method for plating an elongated article comprising:

wrapping the article around a plurality of essentially cylindrical members to form a plurality of loops, each cylindrical member including a plurality of grooves of varying depths in its outer surface in which the article is positioned;

completely immersing the members within a plating solution; and

rotating the members at a prescribed speed while said members and article are immersed within the plating solution so as to control the thickness of plating on said article.

4,959,130

ULTRAMICROELECTRODE, PROCESS FOR MAKING SAME AND ITS APPLICATION

Mira Josowicz, Robert Koch Str. 20, and Karin Potje-Kamloth, Rathaus-Str. 2, both of 8012 Ottobrunn, Fed. Rep. of Germany

Filed May 15, 1989, Ser. No. 353,076

Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816458

Int. Cl.[5] G01N *27/30, 27/333;* **C25D** *9/02*

U.S. Cl. 204—32.1 **33 Claims**

1. In an electrode having a wire made of noble metal and/or carbon and an insulating layer applied thereon, the improvement wherein said insulating layer is made from a compound selected from the group consisting of substituted poly(1,4-phenylene) ethers, poly(1,4-phenylene) thioethers and poly(1,4-aniline)s, whose plurality of phenyl groups are cross-linked at their ortho-positions by alkylene groups with from two to ten carbon atoms.

11. A process for making an electrode comprising a wire made of a noble metal or carbon and an insulating layer thereon comprising the steps of:

a. depositing a polymer layer anodically on said wire made of said noble metal and/or carbon by electrochemical polymerization of monomers selected from the group consisting of phenol-, thiophenol-, aniline-containing monomers and their combinations, which contain in an ortho-position unsaturated aliphatic groups with 2 to 10 carbon atoms, from an electrolytic bath having an alkaline medium, which contains an amine and an adhesion promoting agent; and

b. cross-linking said polymer layer to form said insulating layer.

4,959,131

GAS PHASE CO_2 REDUCTION TO HYDROCARBONS AT SOLID POLYMER ELECTROLYTE CELLS

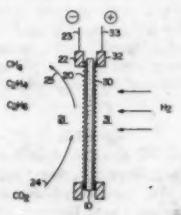
Ronald L. Cook, Aurora, and Anthony F. Sammells, Naperville, both of Ill., assignors to Gas Research Institute, Chicago, Ill.

Filed Oct. 14, 1988, Ser. No. 257,727

Int. Cl.[5] C25B *3/04*

U.S. Cl. 204—59 R **26 Claims**

1. A process for gas phase electrochemical reduction of at least one of CO_2 and CO to gaseous hydrocarbon products at solid polymer electrolyte cells, said process comprising: passing a current between a cathode in contact with one side of a hydrogen ion conducting solid polymer electrolyte and an anode in ionic communication with the opposite side of said solid polymer electrolyte, said cathode comprising a metal electrocatalyst deposited on said electrolyte and capable of providing adsorption sites for at least one of CO_2 and CO and chemisorbed hydrogen species and faradaically generated hydrogen species in proximity to said at least one of adsorbed CO_2 and CO; passing at least one of gaseous CO_2 and CO in contact with said cathode; passing hydrogen ions through said solid polymer electrolyte reducing at least a portion of said CO_2 and CO to gaseous hydrocarbon products comprising



CH_4 and C_2H_4 at said solid polymer electrolyte/cathode interface; and removing said gaseous hydrocarbon products from the region of said cathode.

4,959,132

PREPARING IN SITU ELECTROCATALYTIC FILMS IN SOLID POLYMER ELECTROLYTE MEMBRANES, COMPOSITE MICROELECTRODE STRUCTURES PRODUCED THEREBY AND CHLORALKALI PROCESS UTILIZING THE SAME

Peter S. Fedkiw, Jr., Raleigh, N.C., assignor to North Carolina State University, Raleigh, N.C.

Filed May 18, 1988, Ser. No. 195,218

Int. Cl.[5] C25B *1/00, 1/26*

U.S. Cl. 204—101 **24 Claims**

23. A chloralkali process of the type wherein respective anode and cathode reaction zones are separated by a solid polymer electrolyte membrane, said process comprising the steps of:

providing a cathode reaction zone suitable for conducting a gas phase reaction therein;

providing an anode reaction zone suitable for conducting a liquid phase reaction therein;

providing, in the space between the anode and cathode reaction zones, a bi-polar structure comprising a solid polymer electrolyte membrane with a thin, porous, electronically conductive, high-surface-area metallic electrocatalytic film of metal particles formed in situ within the ionomer matrix at each surface thereof, where the particles are in electrical contact with one another;

connecting the films of the bi-polar structure to a power supply so that one film serves as the anode and one film serves as the cathode;

introducing acidified brine into the anode reaction zone;

introducing an oxygen containing gas into the cathode reaction zone;

conducting the following half cell reaction at the anode:

$$4Cl^- \rightarrow 2CL_2 + 4e^-;$$

conducting the following half cell reaction at the cathode:

$$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O;$$

utilizing the high surface area of contact between the ionomer matrix of the solid polymer electrolyte and the electrodes to facilitate the reactions;

removing chlorine gas and spent brine from the anode reaction zone; and

removing H_2O plus any excess gas from the cathode reaction zone.

4,959,133

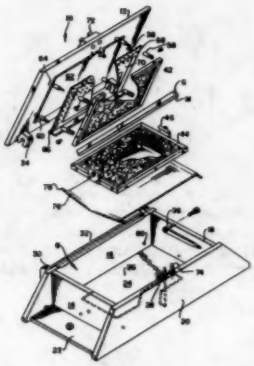
FIELD INVERSION ELECTROBLOTTING & ELECTROELUTION

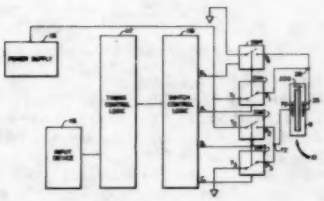
Mark W. Adcock, Guilford, Conn., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 23, 1989, Ser. No. 299,868

Int. Cl.[5] G01N *27/28, 27/26;* B01D *57/02*

U.S. Cl. 204—182.8 **2 Claims**





1. A method of transferring separated nucleic acids or proteins from an electrophoresis gel to a membrane, comprising the steps of

(a) placing a gel with already-separated nucleic acids or proteins in contact with a membrane to which the acids or proteins are to be transferred;

(b) positioning the contacted gel and membrane between two oppositely disposed electrodes;

(c) applying to one of said two electrodes for a time T1, a charge $+V1$, and on the other electrode a charge $-V1$, the electrode closest to said gel having the voltage with the same sign as the net charge on the nucleic acid or the protein;

(d) for a time T2 that is the same or different from time T1, placing a charge on said one and on said other electrodes of a value $-V2$ and $+V2$, respectively, where $|V1|$ and $|V2|$, and T1 and T2, are selected in magnitude to assure a net migration of the separated nucleic acid or protein from the gel to the membrane; and

(e) repeating steps (c) and (d) until the transfer is complete.

4,959,134

PROCESS AND APPARATUS FOR ELECTROPHORETIC DETERMINATION OF PRIMARY STRUCTURE OF NUCLEIC ACIDS

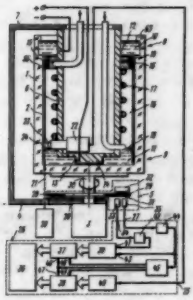
Valery N. Gross; Evgeny V. Kozhanov, both of Alma-Ata; Murat A. Aitkhozhin, deceased, late of Alma-Ata (by Galina T. Darkanbaeva, administrator); David R. Beritashvili, Moscow; Evgeny N. Tverdokhlebov, Moscow, and Georgy P. Georgiev, Moscow, all of U.S.S.R., assignors to Institut Molekulyarnoy Biologii I Biokhimii Akademii Nauk KazSSR, Alma-ata, U.S.S.R.

Filed Nov. 17, 1988, Ser. No. 272,622

Claims priority, application U.S.S.R., Nov. 27, 1987, 4329687[U]

Int. Cl.[5] G01N *27/26*

U.S. Cl. 204—182.8 **16 Claims**



1. A process for electrophoretic determination of the primary structure of a nucleic acid comprising:

(a) preparing samples of a nucleic acid in the form of fragments of its polymeric claim containing tags;

(b) placing the samples into recesses located on a circumference of an end face of a gel in a shape of a hollow cylinder;

(c) applying an electrical potential to the end faces of the hollow cylinder for an electrophoretic separation of said fragments in the direction of passage of an electric current in accordance with the size of said fragments;

(d) maintaining said gel at a constant temperature level at which movement of said fragments is effected without their chemical combination at hydrogen bonds, by providing a layer of a temperature controlled non-polar liquid, located on one side of a lateral surface of the hallow cylinder, and wherein the non-polar liquid layer is of a height about equal to the height of the hollow cylinder;

(e) recording said fragments according to their tags by rotating said gel shaped as a hollow cylinder around its axis to determine a relative position of said fragments in said gel to determine the sequence of nucleotides in the nucleic acid molecule.

5. An apparatus for the electrophoretic determination of the primary structure of nucleic acids comprising:

(a) a cylindrically-shaped cuvette formed from a dielectric material vertically mounted as a first sleeve; a gel shaped as a hollow cylinder placed adjacent a bottom and a side wall of the first sleeve;

(b) a drive for rotation of said first sleeve around an axis thereof connected with the first sleeve;

(c) a platform on which said drive is mounted;

(d) a first chamber and a second chamber positioned in the upper and lower parts of the first sleeve and communicating with the first sleeve;

(e) a second sleeve formed from a dielectric material having a side wall and a bottom fixedly mounted coaxially with the first sleeve on said platform, said side walls and said bottoms of the first and the second sleeves forming the first and the second chambers;

(f) a first and a second electrode solution, the first electrode solution being located between said bottom and said side walls of the first and second sleeves in the region adjacent to said bottom of said sleeves, in contact with the gel and the second electrode solution located in the upper part of the first and second sleeves between their side walls in contact with the gel;

(g) a first and a second annular electrode positioned coaxially with the first and second sleeves; the first annular electrode being in contact with the first electrode solution and the second annular electrode being in contact with the second electrode solution;

(h) a source of electric potential to which the first and second annular electrodes are connected;

(i) a means for controlling the temperature of the gel comprising a non-polar liquid positioned between the first and the second electrode solutions in the region between said side walls of the first and second sleeves and a heat-exchanger means located in said non-polar liquid, the first electrode solution having a higher density than the density of said non-polar liquid and the second electrode solution being located above said non-polar liquid having a lower density than the non-polar liquid;

(j) a source of a monochromatic radiation with its light beam directed into the gel for exciting a fluorescent radiation;

(k) a detector of the fluorescent radiation having a sensor facing the region of said gel illuminated by said source; the detector having an output;

(l) a recording unit having an information input and an address input, to the information input of which unit said output of said detector is connected

(m) a sensor of the turn angle of the first sleeve having an output connected to said address input of said recording unit.

4,959,135

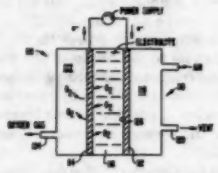
POLYALKYLAMINE COMPLEXES FOR LIGAND EXTRACTION AND GENERATION

Bruce D. Zenner, Berkeley; Joseph P. Ciccone, Davis; Emory S. De Castro, Hercules; Larrie A. Deardurff, Corte Madera, and John B. Kerr, Oakland, all of Calif., assignors to Aquanautics Corporation, Alameda, Calif.

Continuation-in-part of Ser. No. 18,891, Feb. 25, 1987, abandoned. This application Feb. 3, 1989, Ser. No. 306,730

Int. Cl.[5] C25B *1/02*

U.S. Cl. 204—129 **25 Claims**



20. A method for extracting a ligand from a first fluid environment, the method comprising the steps of:

contacting the first fluid environment containing ligand with a first surface of a first ligand-permeable membrane having a first surface and a second surface wherein the membrane separates the environment from an interior space of a container;

contacting an aqueous carrier fluid with the second surface of the membrane wherein the carrier fluid is confined in the container and the carrier fluid contains a carrier compound, whereby at least a portion of a ligand which diffuses through the membrane binds to the carrier compound to give bound ligand complex;

transporting the carrier fluid containing the bound ligand complex to a first electrode compartment of an electrochemical cell which forms a second portion of the container;

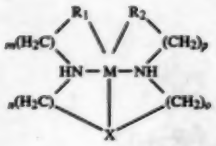
electrochemically modulating the carrier compound to an oxidation state having relatively less binding affinity for ligand, thereby releasing free ligand into the carrier fluid and producing a non-binding state carrier compound;

removing ligand from the carrier fluid to give a ligand depleted carrier fluid;

transporting the ligand depleted carrier fluid containing the non-binding state carrier compound to a second electrode compartment of an electrochemical cell which forms a third portion of the container; and

electrochemically modifying the non-binding state carrier compound to reform the binding state carrier compound;

wherein, the carrier compound comprises a metallic complex of a polyalkylamine having the general formula:



where,

each of R_1 and R_2 is independently an organic group including a nitrogen atom coordinated to M;

each of m, n, o, and p is independently 1, 2, 3, or 4;

X is selected from the group consisting of 2,6-pyridyl, substituted 2,6-pyridyl, 2,4-imidazolyl, substituted 2,4-imidazolyl and;

and

M is a transition metal ion.

4,959,136

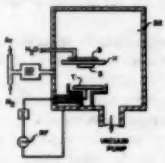
METHOD FOR MAKING AN AMORPHOUS ALUMINUM-NITROGEN ALLOY LAYER

Tukaram K. Hatwar, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 908,365, Sep. 17, 1986, Pat. No. 4,719,154. This application Jun. 29, 1987, Ser. No. 67,758

Int. Cl.[5] C23C *14/34*

U.S. Cl. 204—192.15 **2 Claims**



1. A method for producing an amorphous layer of an aluminum nitrogen alloy on a substrate, said method comprising the steps of:

(a) disposing said substrate in close proximity to an aluminum target in a low pressure atmosphere of nitrogen and an inert gas;

(b) reactive sputtering an aluminum nitrogen alloy onto said substrate at a rate exceeding 15 nanometers/min. while maintaining (i) the nitrogen to inert gas ratio between

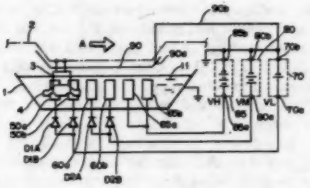
about 30 and 50%, (ii) the substrate temperature at less than about 80° C., (iii) the sputtering power between about 600 and 1000 Watts, (iv) the nitrogen flow rate between about 3 and 6 sccm, and (v) the total sputtering pressure between about 1 and 15 mTorr.

4,959,137

ELECTROCOATING SYSTEM WITH MULTISTAGE VOLTAGE APPLICATION TO PREVENT ELECTRODE COATING

Isamu Matsuoka, and Noboru Sato, both of Mie, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 24, 1989, Ser. No. 342,522
Claims priority, application Japan, Jan. 24, 1989, 1-14380
Int. Cl.[5] C25D *13/22*
U.S. Cl. 204—299 EC **6 Claims**



1. An electrocoating system with multistage voltage application, comprising:

an electrocoating bath filled with a coating material and having inlet and outlet sides;

feed means for supporting and moving an object to be immersed and coated in said electrocoating bath so that the object will function as an electrode;

electrode means including a plurality of voltage-application stages arranged successively from said inlet to outlet sides of said electrocoating bath, each of said stages having at least one electrode arranged along a path of travel of an object as moved by said feed means;

power supply means for applying different, independently variable voltages through said stages, respectively; and

diode means for preventing said electrodes of said stages from being electrocoated with the coating material, said diode means including a plurality of diodes which are forward-connected respectively between said power supply means and each of said electrodes of said stages other than those stages to which a maximum voltage is applied by said power supply means.

4,959,138

MEASURING PROBE FOR THE POTENTIOMETRIC DETERMINATION OF ION CONCENTRATIONS

Heinz-Jürgen Brinkmann, Frankfurt am Main, Fed. Rep. of Germany; Hans W. Bühler, Wacdenswil, Switzerland, and Albert Lohrum, Frankfurt am Main, Fed. Rep. of Germany, assignors to Ingold Messtechnik AG, Urdorf, Switzerland

Continuation-in-part of Ser. No. 646,300, Aug. 31, 1984. This application Aug. 15, 1988, Ser. No. 232,007
Claims priority, application Switzerland, Sep. 7, 1983, 4889/83
Int. Cl.[5] G01N *27/30*
U.S. Cl. 204—414 **30 Claims**

1. A measuring probe for the potentiometric determination of ion concentrations, comprising:

a reference element containing an electrode immersed in an electrolyte and assuming a predetermined electrode potential;

an electrolyte providing electrolytic conductive connection between said reference element and a sample solution to be investigated by means of the measuring probe;

a housing of electrically insulating material;

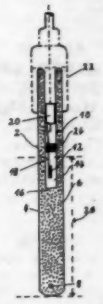
said housing being provided with at least one hollow space for containing said reference element and said electrolyte;

the housing having at least one aperture via which said electrolyte may be brought into contact with said sample solution located outside the housing;

said electrolyte comprising an ion-permeable microporous polymer gel formed in situ in said housing and filling said at least one hollow space;

said ion-permeable microporous polymer gel comprising a polymer polymerized in situ in said housing in a suspension of silica gel in a saturated aqueous solution of a neutral salt containing suspended neutral salt particles;

said silica gel incorporated in said ion-permeable microporous polymer gel rendering the measuring probe pressure resistant to pressures in excess of 10 bars;



said predetermined electrode potential of said electrode being negligibly variable with pressure and pressure variations in the range of environmental pressure in excess of 10 bars due to the presence of said silica gel;

said silica gel adsorbing xeno-ions and thereby rendering said predetermined electrode potential substantially independent of the presence of such xeno-ions in said electrolyte as the result of diffusion from sample solutions investigated using the measuring probe;

the neutral salt forming said saturated aqueous solution containing ions having predetermined transport numbers; and

said neutral salt particles suspended in said saturated aqueous solution being substantially homogeneously distributed throughout said ion-permeable microporous polymer gel and containing ions having transport numbers which are substantially the same as said predetermined transport numbers of said neutral salt dissolved in said saturated aqueous solution.

4,959,139

BINDER PITCH AND METHOD OF PREPARATION

Dave L. Blakeburn, II; Ta-Wei Fu, and Keith M. Rousscl, all of Ponca City, Okla., assignors to Conoco Inc., Ponca City, Okla.

Filed Jan. 9, 1989, Ser. No. 295,425
Int. Cl.[5] C10C *1/00, 3/00*
U.S. Cl. 208—39 **15 Claims**

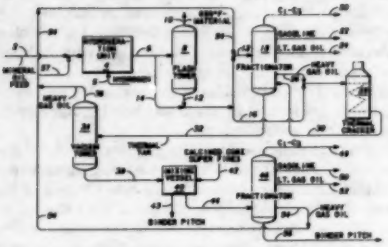
1. A process for the preparation of binder pitch which comprises:

(a) subjecting a petroleum aromatic mineral oil to hydrotreating,

(b) subjecting the hydrotreated product to thermal cracking,

(c) subjecting thermal tar from the thermal cracking to distillation, and

(d) combining topped thermal tar obtained from step (c) with finely subdivided calcined premium coke particles



having an average diameter between about 1 and about 40 microns to form a binder pitch.

4,959,140

TWO-CATALYST HYDROCRACKING PROCESS

Simon G. Kukes, Naperville; Louis C. Gutberlet, Wheaton, both of Ill., and Albert L. Hensley, Munster, Ind., assignors to Amoco Corporation, Chicago, Ill.

Filed Mar. 27, 1989, Ser. No. 328,577

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.[5] C10G *65/10*

U.S. Cl. 208—59 **11 Claims**

1. A process for hydrocracking a hydrocarbon feedstock with hydrogen at hydrocracking conversion conditions in a plurality of reaction zones in series which comprises:

(a) contacting said feedstock in a first reaction zone with a first reaction zone catalyst comprising a nickel component and a tungsten component deposed on a support component consisting essentially of an alumina component and a y zeolite; and

(b) contacting the effluent from said first reaction zone in a second reaction zone with a second reaction zone catalyst comprising a cobalt component and a molybdenum component deposed on a support component consisting essentially of an alumina component and a y zeolite.

4,959,141

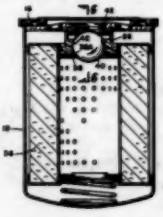
FUEL FILTER WITH POSITIVE WATER SHUTOFF

Robert D. Anderson, Tulsa, Okla., assignor to Facet Quantek, Inc., Tulsa, Okla.

Filed Aug. 14, 1989, Ser. No. 393,222

Int. Cl.[5] B01D *27/10*

U.S. Cl. 210—109 **7 Claims**



1. A fuel filter having improved means of preventing water and particulate contaminant from passing therethrough comprising:

a cannister having a closed and an opened end;

a plate secured to the cannister open end and having a central fuel outlet opening therein and at least one fuel inlet opening spaced from said outlet opening;

a rigid tubular fuel pervious member within said cannister having an upper and lower end, the upper tubular end being in sealed communication with said central fuel outlet opening;

flexible filter media surrounding the outer tubular surface of said rigid tubular fluid pervious member through which fuel freely passes but which resists the passage of particulate matter and water;

a first washer member having an opening therethrough secured concentrically to the tubular member lower end, the first washer member being of thin deformable material;

a ball within said cannister and normally in engagement with said first washer member as fuel flows through the filter, the ball having a diameter greater than the internal diameter of said first washer member and thereby serving to close the lower end of said tubular member;

an annular seat member having closed communication between said central fuel outlet opening and the interior of said tubular member at said upper end, the annular seat being closed to fuel flow when engaged by said ball;

a second washer member supported concentrically adjacent to and spaced from said annular seat member, the second washer member being of thin deformable material and having an opening therethrough normally of diameter slightly less than the diameter of said ball, said second washer member being deformable to permit said ball to pass when a predetermined fuel pressure drop develops across said flexible filter media to thereby engage said annular seat member to block further fuel flow through the filter, the second washer member serving to thereafter retain said ball adjacent said annular seat member even in the absence of fuel pressure.

4,959,142

WATER TREATING APPARATUS

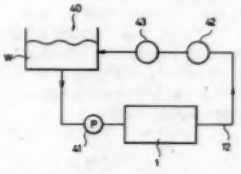
Fumio Dempo, Saitama, Japan, assignor to Aoi Fukuda and Kiyoko Suzuki, both of, Japan

Filed Jun. 23, 1988, Ser. No. 210,639

Claims priority, application Japan, Jan. 29, 1988, 63-17438

Int. Cl.[5] C02F *9/00*

U.S. Cl. 210—167 **8 Claims**



1. A water treating apparatus for sterilizing and purifying water from a water tank, comprising a circulating type water pipe connected to withdraw water from said water tank outside the water tank and return the water to the water tank; an ozone supply apparatus, a filtering apparatus, and an ultraviolet-light irradiating apparatus being provided in series in the water pipe for treating the withdrawn water before its return to said tank; said ozone supply apparatus being provided with a main pipe situated in the course of the water pipe and having an upstream side for receiving the main water flow from said water tank, and a downstream side for discharging flow; a flow separating pipe having a base end being connected to the upstream side of the main pipe to divert a thereby separated flow therefrom, and the forward end of said flow separating pipe being inserted to be re-entrant into the central section of the main pipe from the downstream side of the main pipe so that part of the flow separating pipe may extend in parallel

with the main pipe toward the upstream side of the main pipe, and the separated flow taken from said base end may be discharged from said forward end against the main water flow in the main pipe;

a magnetic treating section for magnetically treating the main water flow by a plurality of magnets arranged to be exposed to the main water being provided in the upstream side of said main pipe;

said flow separating pipe being provided with a pressurizing section for pressuring the separated flow for discharging same from said forward end, an ozone injecting section for injecting ozone into the separated flow, and a primary mixing section for mixing the injected ozone into the separated flow; and

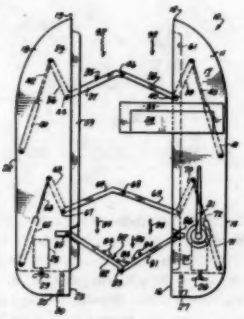
a secondary mixing section for mixing the separated flow that is discharged and with which the ozone has been mixed and the main water flow is provided in the downstream side of the main pipe.

4,959,143

OIL SPILL RECOVERY VESSEL

Chester A. Koster, 13120-D La Jolla Cir., La Mirada, Calif. 90638

Filed Mar. 26, 1990, Ser. No. 498,726
Int. Cl.[5] C02B *15/04*
U.S. Cl. 210—242.3 **15 Claims**



1. An oil spill recovery vessel for removing oil spills from the water surface and storing the collected oil, said vessel comprising:

a first hull half including a bow, a stern, a bottom, an outer side, and an inner side, said first hull half being watertight and including propeller, rudder and diesel engine means and including means for separating oil from water and for expelling separated water therefrom;

a second hull half movably connected to said first hull half, said second hull half also including a bow, a stern, a bottom, an outer side, and an inner side, said second hull half being watertight and including propeller, rudder and diesel engine means;

expandable connection means affixed to said first hull half and to said second hull half, said expandable connection means having a contracted position wherein said first hull half and said second hull half are tightly held together and an expanded position wherein said first hull half and said second hull half are completely separated both at the bow and at the stern so that water and oil may pass between the hull halves with little disturbance;

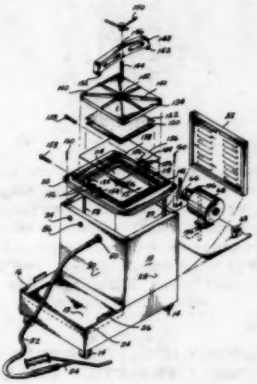
deployable oil skimming means positionable between said first hull half and said second hull half when said expandable connection means is in an expanded position, said deployable oil skimming means having a water and oil inlet located between said first and second hull halves and at least one water and oil outlet located within said means for separating oil from water in said first hull half.

4,959,144

COOKING OIL FILTRATION DEVICE HAVING LOCKING MEANS AND PERIPHERAL CHANNEL MEANS

Robin D. Bernard, Bothell, and John G. Gardner, Woodinville, both of Wash., assignors to Filtercorp, Inc., Bothell, Wash.

Filed Jan. 30, 1989, Ser. No. 303,854
Int. Cl.[5] B01D *35/30*
U.S. Cl. 210—232 **3 Claims**



2. Apparatus for filtering cooking oil comprising:

a reservoir for holding hot cooking oil to be filtered;

means defining a pressure chamber;

pump means adapted to draw cooking oil from said reservoir and pump said oil to said pressure chamber means; and

filter pad means of substantilly uniform thickness and porosity comprising at least fiber and charcoal bound by a resin positioned within said pressure chamber means such that said cooking oil is forced therethrough under positive pressure;

said pressure chamber means including means for supporting said filter pad means positioned on the downstream side of said pad means; cover means positioned above said pad means including downwardly extending lip means adapted to bear against the peripheral edge of said pad means to prevent oil from passing around said pad means; and, means for locking said cover means in place to seal said chamber means and hold said pad means against said support means, said means for locking cover means to seal said pressure chamber means including screw means and a bar means fixed to span the top of said cover means; said screw means being threaded through said bar means and being adapted to bear against said cover means to seal said pressure chamber means as said screw means is rotated downwardly through said bar means.

4,959,145

GAS BAFFLE DEVICE FOR ON-SITE WASTE DISPOSAL SYSTEMS

Theodore W. Meyers, Inverness, Ill., assignor to Tuf-Tite, Inc., Barrington, Ill.

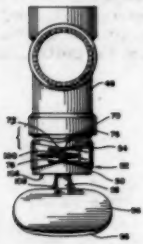
Filed Nov. 13, 1989, Ser. No. 435,600
Int. Cl.[5] B01D *21/00*; C02F *1/40*
U.S. Cl. 210—532.2 **10 Claims**

1. A gas baffle apparatus for use in an on-site waste disposal

tank so as to prevent entry of unwanted substances into the leach field, said gas, baffle comprising:

a mounting strap securely fastened to an outlet line of an on-site waste disposal tank, said outlet line having an outlet opening;

a gas baffle plate carried by said mounting strap and normally maintained thereby adjacent said outlet opening at an angle relative to the horizontal, said gas baffle plate operable to receive and deflect rising gas bubbles and any solid particulates so that said bubbles and particulates do not enter said outlet opening, said gas baffle plate further operable to be temporarily flexibly bent out of the way when engaged by any cleaning apparatus.



4,959,146

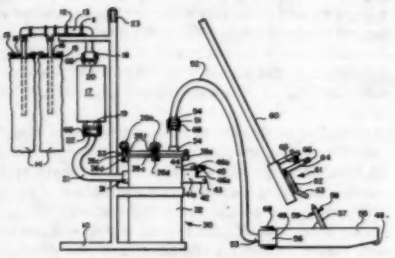
REMOTELY OPERATED SUBMERSIBLE UNDERWATER SUCTION APPARATUS

Louis L. Kristan, 2111 Brentwood Dr., Idaho Falls, Id. 83402

Filed Jan. 21, 1988, Ser. No. 146,506

Int. Cl.[5] B01D *29/10*

U.S. Cl. 210—237 **10 Claims**



1. A completely submersible, remotely operated suction device for underwater collection of irradiated debris found in water in a nuclear pool comprising:

a submersible pump means for pumping the water in the pool, said pump means having an inlet and an outlet;

a submersible filter means or capturing irradiated debris in the water pumped by said pump means, said filter means including an inlet and an outlet;

a remotely operated releasable connector means for releasably connecting said outlet of said filter means to said inlet of said pump means;

a submersible collection means for collecting irradiated debris having an inlet and an outlet;

a remotely operated releasable connector means for releasably connecting said outlet of said collection means to said inlet of said filter means;

means for maneuvering said inlet of said collection means in the pool of water; and

means for remotely removing the irradiated debris from said filter means while said filter means is underwater.

4,959,147

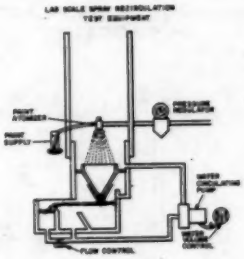
PAINT DETACKIFICATION USING INORGANIC PARTICLES

Shu-Jen W. Huang, and Claudia V. Stenger, both of Naperville, Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Filed Nov. 7, 1988, Ser. No. 267,597

Int. Cl.[5] C02F *1/52*

U.S. Cl. 210—712 **3 Claims**



1. A method for the treatment of the circulating water which collects surplus paint in a paint spray booth which comprises treating this water with a clay-free paint detackifying agent containing an effective detackifying amount of a water-dispersible clay-free inorganic oxide chosen from the group consisting of the oxides of titanium, manganese, iron, and aluminum, which inorganic oxides have a dry average particle size less than 25 microns, thereby forming a nontacky surplus paint sludge, and then collecting and separating said non-tacky sludge from the circulating water.

4,959,148

METHOD AND APPARATUS FOR SPECIFIC AFFINITY ENHANCED TRANSPORT BIOREACTOR

William T. Clark, III, No. 13, Park La., Folsom, La. 70437

Filed Jan. 23, 1989, Ser. No. 299,446

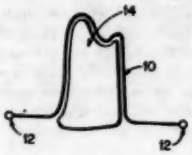
Int. Cl.[5] B01D *15/08*

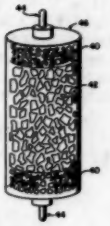
U.S. Cl. 210—635 **67 Claims**

1. A bioreactor capable of retaining therapeutic reactants and reaction products while confining reaction within the bioreactor comprising:

a chamber; a hydrogel polymer within said chamber; and a bioreactant within said chamber, said bioreactant having

been quenched by a displaceable surrogate material so that said hydrogel polymer forms around the bioreactant with





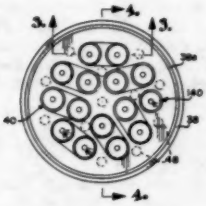
sufficient intimacy to replicate its shape but without chemically attaching to or embedding said bioreactant.

4,959,149

MULTIPLE TUBE SERIES MEMBRANE FILTRATION MODULE AND METHOD OF PREPARING SAME

Joseph J. Raneri, Woburn, Mass., assignor to Koch Industries, Inc., Wichita, Kans.

Filed Jun. 15, 1989, Ser. No. 366,433
Int. Cl.[5] B01D *61/14, 61/18*
U.S. Cl. 210—636 **6 Claims**



1. A method of preparing a filtration module which includes a plurality of filtration tubules coupled in series which tubules are cleanable by sponge ball scouring, said method comprising the steps of:

providing a hollow elongated filtration vessel having first and second open ends and means for removing permeate therefrom;

providing first and second mold members each being adapted to be received in one of said open ends and configured to present a mold for an end plug which presents a portion of a plurality of distinct unitary U-shaped couplings each of which couples an adjacent pair of said tubules in fluid tight relationship and is characterized by an absence of uneven surfaces which cause hang up of said sponge balls;

placing open of said mold members in one of said ends;

positioning a plurality of said filtration tubules in said vessel and joining said tubules with said one mold member;

placing the other of said mold members in the other of said ends and joining said tubules with said second mold member;

orienting said vessel to a vertical position;

introducing a moldable material into the bottom end of said vessel to at least partially surround one of said mold members and said tubules;

allowing said material to harden to present one of said end plugs;

orienting said vessel to a second vertical position with the ends thereof rotated 180° from said first position;

introducing a moldable material into the bottom end of said vessel when the latter is in said second vertical position to at least partially surround the other of said mold members and said tubules;

allowing said material to harden to present the other of said end plugs;

removing said mold members from the ends of said vessel; and

covering the ends of said plugs with first and second end plates which complete said U-shaped couplings.

4,959,150

FLUID TREATMENT SYSTEM HAVING LOW AFFINITY FOR PROTEINACEOUS MATERIALS

Peter J. Degen, Huntington, N.Y., assignor to Pall Corporation, Glen Cove, N.Y.

Filed Sep. 26, 1988, Ser. No. 249,321
Int. Cl.[5] B01D *69/02*
U.S. Cl. 210—638 **27 Claims**

23. A method of filtering a fluid containing a proteinaceous material with a minimal loss of the proteinaceous material, comprising:

introducing a fluid containing a proteinaceous material to a filtration system having a low affinity for amide group-containing materials, which filtration system comprises

(a) a porous structure,

(b) fluid contacting components including means to retain said porous structure, and

(c) a surface-modifying polymeric material having a low affinity for amide group-containing materials formed in situ and bonded directly to the surface of said porous structure and said fluid contacting components; and

passing said fluid through said porous structure.

4,959,151

PERVAPORATION METHOD OF SEPARATING LIQUID ORGANIC COMPOUND MIXTURE THROUGH AROMATIC IMIDE POLYMER ASYMMETRIC MEMBRANE

Masayuki Nakatani; Makoto Matsuo, and Yoshihiro Kusuki, all of Ichihara, Japan, assignors to UBE Industries, Yamaguchi, Japan

Filed Sep. 26, 1989, Ser. No. 412,892
Claims priority, application Japan, Sep. 27, 1988, 63-239838; Oct. 7, 1988, 63-252052; Oct. 7, 1988, 63-25053; Oct. 7, 1988, 63-252054; Oct. 7, 1988, 63-252055; Oct. 7, 1988, 63-252056
Int. Cl.[5] E01D *61/36*
U.S. Cl. 210—640 **18 Claims**

1. A method comprising: separating a liquid organic compound mixture which forms azeotropes, by pervaporation, further by,

bringing a mixture of two or more types of organic compounds in the state of a liquid into contact with one face of an aromatic imide polymer asymmetric membrane which comprises a solvent soluble polymerization product of:

(A) an aromatic tetracarboxylic acid component comprising

(a) 70 to 100 molar % of at least one principal member selected from the group consisting of biphenyl tetracarboxylic acids, diphenylether tetracarboxylic acids, and dianhydrides, esters and salts of the above-mentioned acids, and

(b) 0 to 30 molar % of at least one additional member selected from the group consisting of aromatic tetracarboxylic acids, and dianhydrides, esters and salts of those acids which are different from the above-mentioned compounds for the principal member; with

(B) an aromatic diamine component comprising at least one member selected from the group consisting of:

(c) an ingredient comprising:

(i) 85 to 100 molar % of at least one principal member selected from aromatic diamines having 2 to 3 benzene ring structures, and

(ii) 0 to 15 molar % of at least one member selected from aromatic diamines other than the above-mentioned diamines (i) for the principal member;

(d) an ingredient comprising:

(iii) 15 to 100 molar % of at least one member selected from the group consisting of 9,10-di(aminophenyl)anthracene compounds, di(aminophenoxy) diphenylsulfone compounds, di(aminophenoxy)biphenyl compounds, and di(aminophenoxy) diphenylalkane compounds,

(iv) 0 to 85 molar % of least one member selected from aromatic diamines having 2 to 3 benzene ring structures, and

(v) 0 to 15 molar % of at least one member selected from aromatic diamines having one member selected from the group consisting of one benzene ring structure and one pyridine ring structure; and

(e) an ingredient comprising:

(vi) 15 to 50 molar % of at least one member selected from aromatic diamines having one member selected from the group consisting of one benzene ring structure and one pyridine ring structure, and

(vii) 50 to 85 molar % of at least one member selected from aromatic diamines having 2 to 3 benzene ring structures,

exposing the opposite face of the aromatic imide polymer asymmetric membrane to an atmosphere under a reduced pressure, to cause at least one type of the organic compound in the mixture to selectively permeate through the asymmetric membrane and the permeated organic compound to be vaporized; and

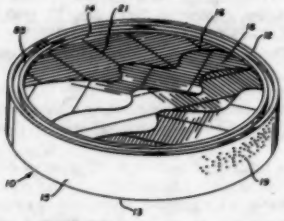
collecting the permeated and vaporized organic compound.

4,959,152

HOLLOW FIBER SEPARATION MODULE AND METHOD FOR THE USE THEREOF

Randall W. Nichols, North Olmsted, Ohio, assignor to The Standard Oil Company, Cleveland, Ohio

Filed Mar. 24, 1989, Ser. No. 328,335
Int. Cl.[5] B01D *61/18*
U.S. Cl. 210—651 **29 Claims**



18. A method for the separation of fluid feedstreams into permeate and retentate portions comprising the steps of:

providing a separate module having a feedstream inlet and a retentate chamber, connected by a plurality of wafers in axial alignment, each said wafer comprising

a mat of hollow fibers arranged chord-wise of said wafer and in a plurality of flat layers, each said layer having a plurality of straight hollow fibers in adjacent, parallel alignment with axial flow space therebetween; and

continuous peripheral support means encompassing the ends of said hollow fibers;

directing said feedstream through said feedstream inlet over said wafers and axially therethrough;

separating said feedstream into a permeate portion, which permeates said hollow fibers and flows radially through said peripheral support means into said permeate chamber, and a retentate portion, which passes around said hollow fibers and axially into said retentate chamber; and

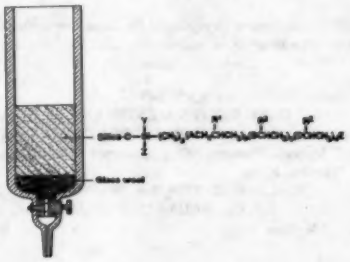
removing said permeate and said retentate from said module.

4,959,153

PROCESS OF REMOVING IONS FROM SOLUTIONS BY FORMING A COMPLEX WITH A SULFUR CONTAINING HYDROCARBON COVALENTLY BONDED TO SILICA

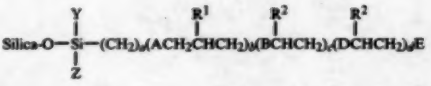
Jerald S. Bradshaw; Byron J. Tarbet; Krzysztof E. Krakowiak; Jan F. Biernat; Ronald L. Bruening, and Reed M. Izatt, all of Provo, Utah, assignors to Brigham Young University, Provo, Utah

Filed Jul. 13, 1988, Ser. No. 218,156
Int. Cl.[5] B01D *15/00*
U.S. Cl. 210—670 **12 Claims**



1. A process of removing desirable ions from a mixture thereof in solution with other ions, said process comprising

complexing the desired ions in said solution with a compound comprising silica covalently bonded to a sulfur-containing hydrocarbon, said compound having the formula:



wherein

A, B, and D are selected from the group consisting of O, OCH_2, S and SCH_2, but B or D must be S or SCH_2;

E is selected from the group consisting of H, SH, OH, lower alkyl and $S(CH_2CH(R^1)CH_2O(CH_2)_eSiYZ(O\text{-silica})$;

Y and Z are selected from the group consisting of Cl, OCH_3, OC_2H_5, O-silica, methyl, ethyl and halogenated substituents thereof;

R^1 is selected from the group consisting of H, SH, OH, lower alkyl, phenyl, naphthyl and pyridyl;

R^2 is selected from the group consisting of H and lower alkyl;

silica is selected from sand and silica gel; and

a is an integer from 2 to about 10; b is an integer of 0 or 1; c is an integer of 1 to about 5; d is an integer of 0 to about 5,

breaking said complex to liberate the complexed ions,

dissolving said liberated ions in a receiving liquid, and

recovering said ions from said receiving liquid.

4,959,154

METHOD FOR OIL SPILL CLEANUP

John J. Simmons, 220 Avenue "B" W., Bismarck, N. Dak. 58501

Filed Apr. 12, 1989, Ser. No. 336,687
Int. Cl.[5] C02F 1/28
U.S. Cl. 210—680 13 Claims

1. A method for containment and collection of oil on a surface comprising the steps of:

(a) placing wood chips in contact with oil on said surface, said wood chips being selected from the group consisting of hot-oil dried wood chips having a water content of less than about 30% and an oil content of between about 1 to about 25% by weight, and hot-wax dried wood chips having a water content of less than about 20% and a wax content between about 1 and 25% by weight; and

(b) allowing said wood chips to pickup said oil.

4,959,155

METHOD FOR THE PURIFICATION OF FLUIDS SUCH AS WATER, AQUEOUS FLUIDS AND FUEL FLUIDS

Luis Gomez, 299 Alhambra Circle, Suite 309, Coral Gables, Fla. 33134

Filed May 23, 1989, Ser. No. 355,704
Int. Cl.[5] B01D 15/00; C23F 11/18
U.S. Cl. 210—687 6 Claims

3. A method for the purification of a fluid selected from the group consisting of water, aqueous fluids and fuel fluids which comprises contacting said fluid with an alloy, wherein said alloy comprises from about 20 to 28% zinc; from about 0.5 to 8% nickel; from about 0.005 to 2.5% aluminum; from about 7 to 15% manganese; and from about 1.3 to 4.5% tin, said percentages being based on the total alloy.

4,959,156

BLOCK CO-POLYMERS USEFUL AS AQUEOUS DISPERSANTS

Donald L. Lickei, Wallingford, Conn.; Michael L. Rosin, Dellwood, Minn., and Ming Shen, Guilford, Conn., assignors to Olin Corporation, Cheshire, Conn.

Division of Ser. No. 79,554, Jul. 30, 1987, Pat. No. 4,847,410.
This application Apr. 10, 1989, Ser. No. 335,656
Int. Cl.[5] C02F 5/12, 1/00
U.S. Cl. 210—701 8 Claims

1. A method of inhibiting water-scale formation in an aqueous composition comprising adding to said aqueous composition a liquid acrylic acid/acetate-capped polyethylene glycol-monoallyl ether co-polymer prepared by a process which comprises the steps of:

(a) reacting an acetylating agent with an allyl ether of polyethylene glycol to produce an acetate-capped polyethylene glycol-monoallyl ether, and

(b) reacting said acetate-capped polyethylene glycol-monoallyl ether with an acrylic compound selected from the group consisting of acrylic acid, methacrylic acid, and mixtures thereof, in a solvent-free reaction to produce said liquid acrylic acid/acetate-capped polyethylene glycol-monoallyl ether co-polymer.

4,959,157

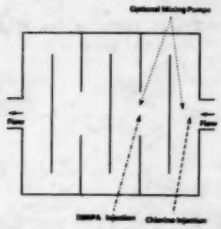
WASTEWATER DISINFECTION WITH A COMBINATION OF BIOCIDES

Robert J. Karbowski, Sanford, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Nov. 18, 1988, Ser. No. 272,854
Int. Cl.[5] C02F 1/50
U.S. Cl. 210—752 4 Claims

1. A process for disinfecting wastewater which comprises:

(a) contacting the wastewater with a sufficient amount of chlorine to satisfy the chlorine demand and to provide a residual level of chlorine of from about 0.005 to about 0.05 mg/L and



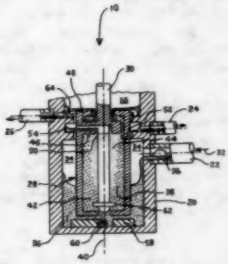
(b) contacting the chlorine-treated wastewater with an effective amount of 2,2-dibromo-3-nitrilopropionamide to disinfect the wastewater.

4,959,158

METHOD FOR SEPARATING DISPARATE COMPONENTS IN A FLUID STREAM

David H. Meikrantz, Idaho Falls, Id., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 30, 1989, Ser. No. 330,589
Int. Cl.[5] B04B 11/00
U.S. Cl. 210—787 1 Claim



1. A method of centrifugally separating disparate components in a separator having a housing, a waste-stream inlet port, a rotor spinning within said housing, a separating zone within said rotor, and radially oriented outlet apertures adjacent the top of the rotor to differentially permit the exit of the disparate components from said rotor, the improvement comprising:

introducing a mixed component waste stream radially into the separator housing through at least one waste-stream inlet port and into an annular space surrounding and adjacent to said rotor, the mixed component waste stream comprising a mixture of water and a water insoluble hydrocarbon petroleum-based product selected from the group consisting of gasoline, diesel fuel, crude oil, motor oil and pump oil;

discharging the water of the mixed component waste stream radially from a radially outward outlet aperture in the top of said rotor and discharging the petroleum-based product of the mixed component waste stream radially from a radially inward outlet aperture in the top of said rotor; and

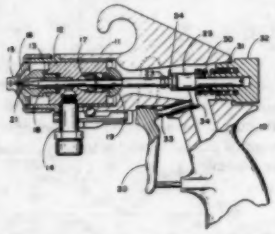
controlling the rate of component discharge from the separator by utilizing the apertures as weirs.

4,959,159

BALL AND SOCKET ATTACHMENT FOR FLUID SPRAY GUN PLUNGER

Roy D. Mattson, 2194 Deer Pass Trail, White Bear Lake, Minn. 55110

Filed Jul. 27, 1989, Ser. No. 386,154
Int. Cl.[5] B05B 7/02
U.S. Cl. 239—526 **2 Claims**



1. In a fluid spray gun having a fluid inlet, an air inlet, a hollow barrel with a fluid exit port and air outlets at one end, a handle attached to the other end of the barrel nd trigger means attached to the barrel near the handle, the improvement comprising:

an elongated plunger extending along the barrel from the handle, said plunger having a pointed end for opening and closing the fluid exit port as the plunger is longitudinally moved;

a ball member attached to the other end of said plunger;

a socket;

means coupling the gun trigger means to said socket for moving said socket back and forth along the barrel in response to the operation of said trigger means;

said socket comprising a chamber for holding said ball member substantially freely rotatable, said socket having a pair of lips defining an opening through which said ball member is insertable into said socket chamber, said lips being resiliently yieldable to permit said ball member to be forcibly inserted into and removed from said socket chamber through said opening yet grasping said ball member when inserted into the socket chamber such that said plunger is moved directly with the back and forth motion of said socket in line with the fluid exit port.

4,959,160

PROCESS FOR THE TREATMENT OF CONTAMINATED EMULSION

Alan W. Lake, Sandton, South Africa, assignor to Iscor Limited, Pretoria and Scientific Construction CC., Bryanston, both of, South Africa

Filed Apr. 13, 1988, Ser. No. 180,993
Claims priority, application South Africa, Apr. 15, 1987, 87/2706
Int. Cl.[5] B01D 17/04
U.S. Cl. 252—340 **18 Claims**

1. A process for the resolution of an emulsion which comprises an internal water phase, an external fat and/or oil containing phase and a finely divided metal contaminant which comprises:

(a) mixing a contaminated emulsion with a volume of water sufficient to increase the total water content to at least 50% on a mass to mass basis, if the water content of the emulsion relative to that of the rest of the emulsion is less than 50% on a mass to mass basis;

(b) adding to the emulsion at least one of a suitable emulsifier and demulsifier;

(c) mixing the emulsion with a short-chain organic acid to lower the pH from to 3-5 and;

(d) allowing the emulsion to settle out into an upper layer comprising the external phase; a lower water layer and a bottom precipitate comprising the contaminant.

4,959,161

CORROSION INHIBITING COMPOSITION

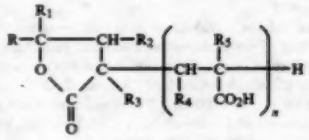
Brian G. Clubley, Wilmslow, England, assignor to Ciba-Geiby Corporation, Ardsley, N.Y.

Filed May 6, 1988, Ser. No. 191,090
Claims priority, application United Kingdom, May 15, 1982, 8711534
Int. Cl.[5] C23F 11/10; C07D 307/02
U.S. Cl. 252—396 **11 Claims**

1. A composition, in contact with a corrodible metal surface, which composition comprises:

(a) an aqueous-based or oil-based system; and

(b) as inhibitor for protecting the metal surface against corrosion, an effective amount of at least one compound having the formula I:



I

as well as salts or partial esters thereof wherein:

n is 0 or an integer ranging from 1 to 20,

R is a straight or branched chain C_4–C_{30}alkyl group, a straight or branched chain C_4–C_{30}alkyl group interrupted by one, two or three oxygen atoms or substituted by one, two or three hydroxy groups, a C_5–C_{12}cycloalkyl group, a C_6–C_{10}aryl group, C_6–C_{10}aryl group substituted by one, two or three C_1–C_{12}alkyl groups, a C_7–C_{13}aralkyl group or a C_7–C_{13}aralkyl group which is substituted by a hydroxyl group;

R_1 is H or a straight- or branched chain C_1–C_4alkyl group;

R_2 is H, a straight or branched chain C_1–C_4alkyl group or CO_2H;

$R_3$is H, straight or branched chain C_1–C_4alkyl group, —CH_2CO_2H or —$CH_2CH_2CO_2H$;

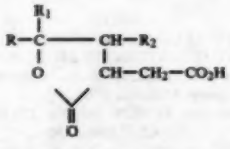
$R_4$is H, a straight or branched chain C_1–C_4alkyl or CO_2H;

R_5 is H, a straight or branch chain C_1–C_4alkyl group, CH_2CO_2H or $CH_2CH_2CO_2H$; with the following provisos

when n is zero $R_2$is CO_2H;

when n is an integer from 1 to 20 at least one group R_4 is CO_2H;

compositions comprising an oil-based system and a compound having the formula



wherein R, R_1 and R_2 are hydrogen or alkyl radicals, having a total number from 10 to 38 C-atoms, are excluded.

4,959,162

COLLOIDAL POLYPYRROLE

Steven P. Armes, Los Alamos, and Mahmood Aldissi, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 3, 1989, Ser. No. 305,816
Int. Cl.[5] H01B 1/06
U.S. Cl. 252—519 19 Claims

1. A processable, electrically conductive polymer composition comprising:

colloidal particles of from about 30 to about 500 nanometers of an oxidized, polymerized aromatic heterocyclic of an oxidized, polymerized aromatic heterocyclic monomer selected from the group consisting of pyrrole, N-substituted pyrrole, and beta-substituted pyrrole;

a stabilizing effective amount of a vinyl pyridine-containing polymer selected from the group consisting of poly(2-vinyl pyridine), poly(3-vinyl pyridine), poly(3-vinyl pyridine), poly(4-vinyl pyridine), a copolymer of 2-vinyl pyridine and a hydrophobic copolymerizable monomer, a copolymer of 3-vinyl pyridine and a hydrophobic copolymerizable monomer, and a copolymer of 4-vinyl pyridine and a hydrophobic copolymerizable monomer, said amount effective to prevent precipitation of said electrically conductive polymer composition; and,

dopant anions remaining from oxidant used in oxidatively polymerizing the aromatic heterocyclic monomer.

4,959,163

POLYAMPHOLYTES-HIGH TEMPERATURE POLYMERS AND METHOD OF USE

Marlin D. Holtmyer, and Charles V. Hunt, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Filed Nov. 3, 1988, Ser. No. 267,489
Int. Cl.[5] E21B 43/26
U.S. Cl. 252—8.551 16 Claims

12. A method of fracturing a subterranean formation comprising:

providing a polyampholyte that is the polymerization product of a mixture of monomers comprising at least one from each of the following groups:

Group I: acrylamide (AM), partially hydrolyzed acrylamide, N,N-dimethylacrylamide, N-substituted - (N'-dialkylaminoalkyl) acrylamides, aminoalkylacrylates, dialkylaminoalkylacrylates or mixtures thereof;

Group II: 2-acrylamido-2-methylpropane sulfonic acid, sodium salt (AMPS®), vinylphosphonic acid (VPA), partially hydrolyzed acrylamide or mixtures thereof; and

methacrylamidopropyldimethyl-2,3-dihydroxypropyl ammonium sulfate (MAPDMDHPAS);

provided that partially hydrolyzed acrylamide may be selected from Group I or Group II, but not both;

wherein said Group I monomer is present in the amount of at least 80 mole percent, but less than 98 mole percent;

wherein said Group II monomer is present in the amount of at least 10 mole percent to 1 mole percent; and

wherein said MAPDMDHPAS is present in the amount of at least 10 mole percent to 1 mole percent;

inverting said polympholyte using a surfactant to form a viscous aqueous liquid;

buffering said aqueous liquid with pH modifying substances selected from the group comprising admixtures of ammonium acetate and acetic acid; potassium bithalate; admixtures of formic acid and sodium bicarbonate in an amount sufficient to adjust the pH to range of about 4 to 6.5;

admixing said polyampholyte in aqueous liquid with a crosslinking agent selected from the group comprising zirconium lactate, zirconium lactate/malate, and zirconium dimalate; and

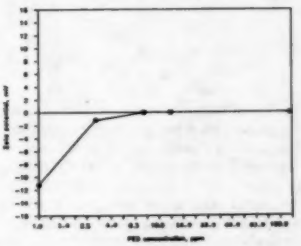
injecting said fluid in a mixture with or without a particulate agent into said formation at a rate and pressure sufficient to fracture said formation.

4,959,164

ROCK FRAGMENTATION METHOD

William H. Engelmann, Minneapolis; Pamela J. Watson, Inver Grove Heights; Patrick A. Tuzinski, Minneapolis; John E. Pahlman, Bloomington, and Sanaa E. Khalafalla, Minneapolis, all of Minn., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Jun. 27, 1988, Ser. No. 211,650
Int. Cl.[5] C09K 7/02
U.S. Cl. 252—8.51 5 Claims



4. A method of decreasing the concentration of anionic or cationic water-soluble oils in drilling and cutting fluids requisite for lubrication of drill bits, drill steel and cutting tools while increasing the drilling or cutting rate comprising the steps of:

determining the minimum concentration of a water-soluble oil needed for lubrication in a drilling or cutting fluid containing a material selected from the group consisting of watersoluble, high-molecular-weight, non-ionic polymers;

determining the zero surface charge (ZSC) concentration of the material selected from the group consisting of water-soluble, high-molecular-weight, nonionic polymers in a drilling or cutting fluid for a solid when the fluid contains the watersoluble oil; and

adding the requisite amount of a material selected from the group consisting of water-soluble, high-molecular-weight, nonionic polyalkene oxide polymers.

4,959,165

WELL COMPLETION AND SERVICING FLUID

R. Leroy Grimsley, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Oct. 28, 1988, Ser. No. 263,841
Int. Cl.[5] E21B 33/13, 43/11
U.S. Cl. 252—8.551 4 Claims

1. A well completion and servicing fluid for controlling formation pressure during completion or servicing of a well, said fluid consisting essentially of:

(a) an aqueous solution of calcium chloride,

(b) a solid weighting agent suspended in said solution and being selected from the group consisting of zinc, zinc oxide, and mixtures thereof; and

(c) a viscosifier dissolved in said solution in an amount effective to suspend said weighting agent;

said fluid having a density of greater than 15 pounds per gallon and being substantially free of bromide ions and being substantially free of solid material which is not soluble in hydrochloric acid.

4,959,166
FLUID COMPOSITION FOR USE IN VISCOUS COUPLING

Hiromu Minamitani, Saitama; Norio Yano, Chiba; Atsushi Ikezawa, Kanagawa; Toshio Kanayama, Kanagawa; Takashi Ushijima, Kanagawa; Masao Teraoka, Tochigi, and Osamu Ishikawa, Tochigi, all of Japan, assignors to Cosmo Oil Co., Ltd., Tokyo; Dow Corning Kabushiki Kaisha, Kanagawa and Tochigifujisangyo Kabushiki Kaisha, Tochigi, all of, Japan

Filed May 27, 1988, Ser. No. 199,827

Claims priority, application Japan, May 30, 1987, 62-136610; Feb. 26, 1988, 63-41913

Int. Cl.[5] C10M *109/50*

U.S. Cl. 252—327 E **9 Claims**

1. A fluid composition for use in a viscous coupling that comprises: (A) from 90% to 99.99% by weight of a base oil consisting essentially of a polyorganosiloxane fluid that is represented by an average unit formula.

(a):

$$(R_1)_aSiO_{\frac{4-a}{2}},$$

where R_1 is selected from the group consisting of a monovalent hydrocarbon group and a monovalent halogenated hydrocarbon group, and a is a number of 1.9 to 2.1, and which has a viscosity of from about 500 to about 500,000 centistokes at 25° C., and (B) at least one component selected from the group consisting of sulfur and sulfur compounds (b) to (g) listed below being added in a minor amount to said base oil:

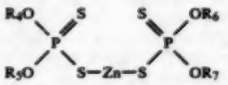
(b) a hydrocarbon sulfide represented by the formula:

$$R_2—S_x—(R_3—S_x)_nR_2$$

where R_2 is a monovalent hydrocarbon group, R_3 is a divalent hydrocarbon group, x is an integer of 1 or more and may be the same or different in the recurring units, and n is 0 or an integer of 1 or more;

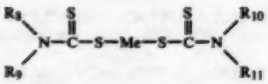
(c) a sulfurized oil or fat which is the reaction product of an oil or fat and sulfur;

(d) a zinc dithiophosphate represented by the formula:



where R_4, R_5, R_6 and R_7 which may be the same or different are each a monovalent hydrocarbon group;

(e) a dialkyldithiocarbamic acid metal salt represented by the formula:



where R_8, R_9, R_{10} and R_{11} which may be the same or different are each an alkyl group, and Me is a metal selected from the group consisting of Zn, Pb, Mo and Sb;

(f) elemental sulfur; and

(g) a sulfurized hydrocarbon compound represented by the general formula:

$$R_{12}—S_x+R_{13}—S_x\rightarrow_n$$

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wherein R_{12} and R_{13} are each of divalent hydrocarbon group, x is an integer of 1 or more and may be the same or different in the recurring units, and n is 0 or an integer of 1 or more.

4,959,167
ASYMMETRIC DISULFIDES IN LUBRICANT COMPOSITIONS

Henri Dubas, Marly, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 2, 1989, Ser. No. 305,834

Claims priority, application Switzerland, Feb. 12, 1988, 516/88-8

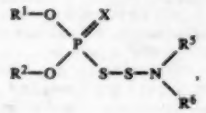
Int. Cl.[5] C10M *135/20*

U.S. Cl. 252—32.7 E **15 Claims**

1. A composition comprising:

(a) at least one substrate selected from the group consisting of a lubricant and a hydraulic fluid and

(b) an amount effective to provide high pressure and antiwear action and to reduce corrosion of at least one compound of the formula



(I)

in which R^1 and R^2 are identical or different and are each an alkyl group having 1 to 30 C atoms, an unsubstituted or C_1–C_8-alkyl-substituted cycloalkyl group having 5 to 12 C atoms, or an unsubstituted or C_1–C_{12}-alkyl-substituted C_6–C_{10}-aryl group, or R^1 and R^2 together are an unsubstituted or C_1–C_{12}-alkyl-substituted alkylene group having 2 to 20 C atoms or an arylene group having 6 to 20 C atoms, and R^5 and R^6 are identical or different and are each an alkyl group having 1 to 30 C atoms, or R^5 and R^6 together are an unsubstituted or C_1–C_{12}-alkyl-substituted alkylene group having 2 to 20 C atoms or an alkylene group which has 2 to 10 C atoms and is interrupted by —O—, —S— or —NR^9—, in which R^9 is H or C_1–C_4-alkyl, and X is O or S.

4,959,168
SULFURIZED COMPOSITIONS, AND ADDITIVE CONCENTRATES AND LUBRICATING OILS CONTAINING SAME

Calvin W. Schroeck, Eastlake, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio

Filed Jan. 15, 1988, Ser. No. 144,369

Int. Cl.[5] C10M *135/02*

U.S. Cl. 252—48.6 **41 Claims**

1. A sulfurized composition prepared by reacting at an elevated temperature a sulfurizing agent with a mixture of reactants comprising:

(A) at least one partial fatty acid ester of a polyhydric alcohol, and

(B) (2) at least one fatty acid.

24. A sulfurized composition prepared by reacting at 100°–210° C. a sulfurizing agent comprising elemental sulfur with a mixture of reactants comprising:

(A) about 10 to about 90 percent by weight of at least one partial fatty acid ester of a polyhydric alcohol,

(B) (2) at least one fatty acid, and

(B) at least one member of the group consisting of

(1) at least one fatty acid ester of a polyhydric alcohol, which fatty acid ester is different from the partial fatty acid ester (A),

(3) at least one olefin, and

(4) at least one fatty acid ester of a monohydric alcohol.

4,959,169

ESTERIFIED POLYGLYCOL LUBRICANTS FOR REFRIGERATION COMPRESSORS

Philip W. McGraw, Lake Jackson; Eldon L. Ward, Angleton, and Michael W. Edens, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Oct. 20, 1989, Ser. No. 425,621
Int. Cl.[5] C10M *105/34, 105/38*
U.S. Cl. 252—68 24 Claims

1. Fluid compositions for use in compression refrigeration which have an upper solution critical temperature equal to or greater than about 35° C. comprising

(A) a refrigerant selected from the group consisting of hydrofluorocarbons and hydrochlorofluorocarbons and

(B) a lubricant composition which comprises polyether polyols or polyether alcohols which have a viscosity between 25 and 150 centistokes at 38° C. and where greater than about 30% of the hydroxyl groups of said polyols or alcohols are esterified wherein said esterified polyether polyols or polyether alcohols have the formula

$$Z-[(CH_2-CH(R_1)-O-)_n-(CH_2-CH_3)-O-)_m-R_2]_p$$

where

Z is the residue of a compound having 1–8 active hydrogens,

R_1 is hydroqen, ethyl, or mixtures thereof,

R_2 is an alkanoyl group of 2 to 6 carbon atoms or hydrogen,

n is 0 or a positive number,

m is a positive number,

n+m is a number having a value which will give an esterified polyether polyol or polyether alcohol with a number average molecular weight range from about 400 to about 2500,

p is an integer having a value equal to the number of active hydrogens of Z.

4,959,170

RINSING COMPOSITION FREE FROM PHOSPHATE

Hannajörg Ulrich, Erftstadt, and Lothar Westermann, Cologne, both of Fed. Rep. of Germany, assignors to Hoechst AG, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 80,961, Aug. 3, 1987, abandoned. This application Nov. 21, 1988, Ser. No. 274,691
Claims priority, application Fed. Rep. of Germany, Aug. 16, 1986, 3627773
Int. Cl.[5] C11D *3/12, 7/20*
U.S. Cl. 252—135 7 Claims

1. An improved rinsing composition for cleaning of hard surfaces and for preventing depositions thereon, said composition consisting essentially of:

as a builder, 30–50 weigth-% of a crystalline layer sodium silicate of the general formula $NaMSi_xO_{2x+1}\cdot y\ H_2O$, in which M stands for sodium or hydrogen, x stands for a number from 1.9 to 4 and y stands for a number from 0 to 20,

as a co-builder, 0.1–7.5 weight-% of at least one substance selected from the group consisting of hydroxymethylene carboxylates, maleic acid anhydride, ethylene vinyl ether or maleic acid anhydride/acrylic acid copolymers or the sodium salts thereof,

0–45 weight-% of a filler,

10–25 weight-% of an alkali carrier,

1–2 weight-% of a surfactant, and

1–5 weight-% of an active chlorine carrier,

said composition being free of phosphate.

4,959,171

SYNDET SOAP CAKES (SOAP BARS) HAVING IMPROVED PROPERTIES

Giovanni Pantini, Milan, and Susanna Savonelli, Voghera, both of Italy, assignors to Ausimont S.r.l., Milan, Italy

Filed Aug. 22, 1989, Ser. No. 396,635
Claims priority, application Italy, Aug. 26, 1988, 21756 A/88
Int. Cl.[5] C11D *9/28, 17/00*; C08F *12/20, 214/00*
U.S. Cl. 252—174 5 Claims

1. Syndet bars containing besides the usual components of said cakes, from 0.001 to 10% by weight of perfluoropolyethers having end perfluoroalkyl groups to reduce cracking of said bars.

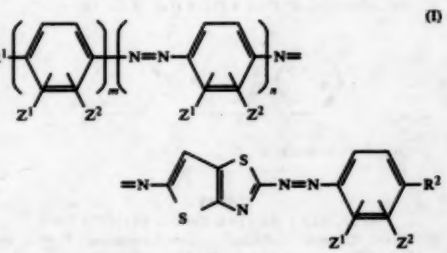
4,959,172

LIQUID CRYSTAL COMPOSITION CONTAINING A PLEOCHROIC AZO TYPE COMPOUND

Konoe Miura, Yokohama; Tetsuo Ozawa, Hadano, and Keiko Yoneyama, Machida, all of Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,528
Claims priority, application Japan, Jun. 4, 1987, 62-140584; Oct. 19, 1987, 62-263563
Int. Cl.[5] C09K *19/00*
U.S. Cl. 252—299.1 13 Claims

1. A liquid crystal composition suitable for a guest-host liquid crystal device comprising a solution of a liquid crystal substance and a pleochroic dye, said pleochroic dye comprising at least one azo type compound having the formula (I),

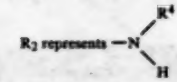


(I)

wherein R^1 represents a hydrogen atom; an alkyl radical having 1 to 3 carbon atoms substituted with a phenyl radical which is substituted by a member of the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms and, a chlorine atom; an alkyl radical having 1 to 8 carbon atoms which may be substituted by an alkoxy radical having 1 to 8 carbon atoms; an alkoxy radical having 1 to 3 carbon atoms substituted by a phenyl radical which is substituted by a member of the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms and a chlorine atom; an alkoxy radical having 1 to 8 carbon atoms which may be substituted by an alkoxy radical having 1 to 8 carbon atoms; a cyclohexyl group which may be substituted by either an alkyl radical having 1 to 8 carbon atoms or —$COOR^3$,

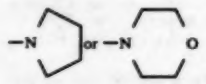
wherein R^3 represents an alkyl radical having 1 to 8 carbon

atoms which may be substituted by an alkoxy radical having 1 to 8 carbon atoms; a cyclohexyl radical substituted by an alkyl radical having 1 to 8 carbon atoms; a phenyl radical substituted by an alkoxy radical having 1 to 8 carbon atoms; or a phenyl radical substituted by an alkyl radical having 1 to 8 carbon atoms,

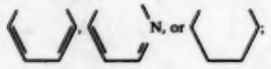


wherein R^4 represents an alkyl radical having 1 to 3 carbon atoms, optionally substituted by a phenyl radical which is substituted by a substituent selected from the group consisting of an alkyl radical having 1 to 8 carbon atoms, an alkoxy radical having 1 to 8 carbon atoms, or a chlorine atom; or

wherein $R^{4'}$ represents an alkyl radical having 1 to 8 carbon atoms, and R^5 represents an alkyl radical having 1 to 8 carbon atoms, or an alkyl radical having 1 to 3 carbon atoms substituted by a phenyl radical which is substituted by an alkyl radical having 1 to 8 carbon atoms, $R^{4'}$ and R^5 being optionally connected to form



Z^1 and Z^2 each represent a hydrogen atom, a chlorine atom, an alkyl radical having 1 to 3 carbon atoms, or an alkoxy radical having 1 to 3 carbon atoms, or Z^1 and Z^2 are connected to form a fused ring of the formula:



m is 1 or 2; and n is 0 or 1.

4,959,173

OPTICALLY ACTIVE ESTER COMPOUND

Toshihiro Shibata, Saitama; Norio Kurosawa, Tokyo, and Masaki Kimura, Saitama, all of Japan, assignors to Adeka Argus Chemical Co., Ltd., Tokyo, Japan

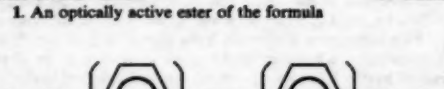
Filed Sep. 8, 1988, Ser. No. 242,177

Claims priority, application Japan, Sep. 29, 1987, 62-244780; Jan. 8, 1988, 63-2226; Apr. 1, 1988, 63-81609

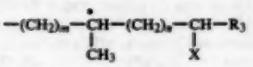
Int. Cl.[5] C09K *19/12*

U.S. Cl. 252—299.65 **10 Claims**

1. An optically active ester of the formula



wherein p is 0 or 1, q is 1 or 2, r is 1 or 2, q+r is 3, s is 0 or 1, and R_1 and R_2 are each independently selected from the group consisting of C_{6-18} straight chain alkyl and an optically active group of the formula



and in which m is 2 to 5, n is 1 or 2, X is hydrogen or chlorine, R_3 is hydrogen or C_{1-11} straight chain alkyl, and C^* represents a chiral carbon atom, and when n is 1 and X is hydrogen, R_3 is C_{1-11} straight chain alkyl; one of R_1 and R_2 being a said optically active group and the other of R_1 and R_2 being a said C_{6-18} straight chain alkyl group; and when q is 2 and r is 1 and R_1 is C_{6-18} straight chain alkyl, p is 1; and when q is 1 and r is 2 and R_2 is a said optically active group, s is 1.

4,959,174

PHOSPHOR WHICH EMITS LIGHT BY THE EXCITATION OF X-RAY

Shigeharu Nakajima; Genichi Shinomiya; Mizuho Takeda, and Satoru Chikutei, all of Anan, Japan, assignors to Nichia Kagaku Kogyo K.K., Tokushima, Japan

Continuation of Ser. No. 219,792, Jul. 14, 1988, abandoned, which is a continuation of Ser. No. 823,299, Jan. 28, 1986, abandoned. This application Mar. 16, 1989, Ser. No. 324,570

Claims priority, application Japan, May 18, 1985, 60-106636; Sep. 6, 1985, 60-198052

Int. Cl.[5] C09K *11/78*

U.S. Cl. 252—301.6 R **1 Claim**

1. A phosphor which emits light by the excitation of X-rays, and has a composition represented by the formula:

$$M_yLn_{1-x-(\frac{y}{2})}DO_4{:}xR^{3+}$$

where:

M is Cd,

Ln is at least one rare earth element selected from the group consisting of Y, Gd and La,

D is Ta, or Ta and Nb,

R is an activator metal of Tm,

y is a value in the range of $1\times10^{-5}\leqq y\leqq6\times10^{-1}$

x is a value in the range of $0\leqq x\leqq0.05$,

said phosphor being obtained by a process comprising admixing an oxide of Ln in an amount corresponding to $1-x-(\frac{y}{2})$ parts by mol of Ln, an oxide of D in an amount corresponding to one part by mol of D, an oxide of R in an amount corresponding to x parts by mol of R and a carbonate of M in an amount corresponding to y parts by mol of M to prepare an admixture, and

firing said admixture at a temperature sufficient to provide a phosphor having said composition and

wherein said phosphor exhibits a smaller afterglow than the same phosphors absent M."

4,959,175

SOLUTION FOR DIALYSES AND USE OF PEPTIDES BASED ON GLYCINE FOR PREPARING IT

Hippocrates Yatzidis, Athens, Greece, assignor to Pierre Fabre Medicament, Paris, France

Filed Jan. 25, 1988, Ser. No. 147,424

Claims priority, application Greece, Jan. 27, 1987, 870129

Int. Cl.[5] A61M *1/14, 1/28;* **A61K** *33/10, 37/18*

U.S. Cl. 252—364 **7 Claims**

1. A method of stabilizing an aqueous dialytic solution of electrolytes including bicarbonate ions comprising incorporating in said solution a peptide based on glycine, and selected from the group consisting of di-, tri-, tetra-, penta- and hexaglycine, said glycine being incorporated in an amount effective to substantially prevent the precipitation of carbonates.

4,959,176

HIGH RESOLUTION NON CORROSIVE AMINO ACID ANALYSIS BUFFER SOLUTIONS

Robert H. Slocum, Portola Valley; Patrick L. Y. Lee, Belmont, and Vivian Arrizon-Lopez, San Jose, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Apr. 29, 1988, Ser. No. 187,702
Int. Cl.[5] G01N *30/96*; C23F *11/04*
U.S. Cl. 252—389.53 9 Claims

1. An aqueous buffer solution for separating the components of a mixed amino acid sample by the ion exchange method which is essentially halogen free and comprising alkali metal salts of tribasic organic acids, alkali metal nitrates, nitric acid and a mold inhibiting agent.

4,959,177

REDUCING STRESS CORROSION CRACKING IN TREATING GASES WITH ALKANOL AMINES

Hans U. Schutt, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation of Ser. No. 106,824, Oct. 9, 1987, abandoned. This application Aug. 16, 1989, Ser. No. 395,202
Int. Cl.[5] C23F *11/10*
U.S. Cl. 252—391 18 Claims

1. A process for reducing stress corrosion cracking of metal weldments in the presence of an aqueous alkanol amine solution which consists of adding to the aqueous alkanol amine solution an effective amount of a stress corrosion cracking inhibitor consisting of a sulfiding agent selected from elemental sulfur or sulfide ion yielding compound.

10. A process for reducing stress corrosion cracking of metal weldments in the absence of hydrogen sulfide during gas treating with an aqueous alkanol amine gas treating solvent solution which consists of adding to the aqueous alkanol amine solution an effective amount of a stress corrosion inhibitor consisting of a sulfiding agent selected from elemental sulfur or a sulfide ion yielding compound.

4,959,178

ACTINIC RADIATION-CURABLE CONDUCTIVE POLYMER THICK FILM COMPOSITIONS AND THEIR USE THEREOF

Richard L. Frentzel, Chino Hills, and Noel C. Peralta, Glendora, both of Calif., assignors to Advanced Products Inc., Cheshire, Conn.

Filed Jan. 27, 1987, Ser. No. 6,837
Int. Cl.[5] C09D *5/24*; C08K *3/08*; C08F *2/50*
U.S. Cl. 252—514 23 Claims

1. An actinic radiation curable polymer thick film composition comprising by weight:

(a) about 10 to about 20 parts of at least one mono-functional unsaturated monomer capable of being polymerized by actinic radiation;

(b) about 2.5 to about 8 parts of at least one thermoplastic polymer having a glass transition value of above about 100° F. and not capable of being substantially cross-linked with polymerized monomer (a) and said polymer (b) is dissolved in monomer (a);

(c) about 68 to about 85 parts of conductive metal particles; and

(d) about 0.1 to about 5 parts of at least one actinic radiation polymerization initiator.

4,959,179

STABILIZED ENZYMES LIQUID DETERGENT COMPOSITION CONTAINING LIPASE AND PROTEASE

Michael P. Aronson, West Nyack, N.Y.; Martin S. Cardinali, Millington., and Jack T. McCown, Cresskill, both of N.J., assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 30, 1989, Ser. No. 304,394
Int. Cl.[5] C11D *3/386*
U.S. Cl. 252—135 6 Claims

1. An enzymatic liquid detergent and cleaning composition comprising, in a liquid medium, from 0-90% by weight of a detergent-active compound, a proteolytic enzyme and a lipolytic enzyme, said lipolytic enzyme being selected from the group consisting of fungal lipases obtainable from *Humicola lanuginosa* and *Thermomyces lanuginosus*, and bacterial lipases which show a positive immunological cross-reaction with the antibody of the lipase, produced by *Chromobacter viscosum* var. *lipolyticum* NRRL-B3673, and an enzyme stabilizing system comprising a mixture of a polyol containing only C, H and O atoms and containing at least two hydroxyl groups and a boron compound which is capable of reacting with said polyol, wherein said polyol has a first binding constant with said boron compound of at least 500 l/mole and a second binding constant of at least 1,000 l^2/mole^2, and wherein the weight ratio of said polyol to said boron compound is greater than 1.0.

4,959,180

COLLOIDAL POLYANILINE

Steven P. Armes, Los Alamos, and Mahmoud Aldissi, Santa Fe, both of N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Feb. 3, 1989, Ser. No. 305,817
Int. Cl.[5] H01B *1/00*, *1/06*
U.S. Cl. 252—519 12 Claims

1. A processable, electrically conductive polymer composition comprising:

colloidal particles of an oxidized, polymerized amino-substituted aromatic monomer selected from the group consisting of aniline or substituted anilines;

a stabilizing effective amount of a random copolymer containing amino-benzene moieties as said chain substitutents said amount effective to prevent precipitation of said electrically conductive polymer composition; and

dopant anions.

4,959,181

ION EXCHANGE USING HYDROUS URANIUM DIOXIDE

David A. White, and Paul Donson, both of London, United Kingdom, assignors to British Nuclear Fuels PLC, Warrington, United Kingdom

Division of Ser. No. 112,458, Oct. 26, 1987, abandoned. This application Mar. 20, 1989, Ser. No. 326,487
Claims priority, application United Kingdom, Oct. 27, 1986, 8625657
Int. Cl.[5] C01G *43/01*; C02F *1/42*
U.S. Cl. 252—625 3 Claims

1. A method of carrying out ion exchange on a solution, comprising contacting the solution with an ion-exchange material consisting essentially of solid hydrous uranium dioxide which is in a form suitable for carrying out ion exchange.

4,959,182

METHOD AND COMPOSITIONS PROVIDING ENHANCED CHEMILUMINESCENCE FROM 1,2-DIOXETANES

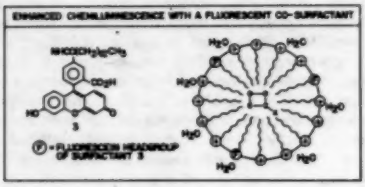
Arthur P. Schaap, Detroit, Mich., assignor to Board of Governors of Wayne State University, Detroit, Mich.

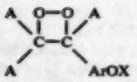
Division of Ser. No. 224,681, Jul. 27, 1988, which is a continuation-in-part of Ser. No. 887,139, Jul. 17, 1986. This application Mar. 1, 1989, Ser. No. 317,585
Int. Cl.[5] C09K *3/00*; C12Q *1/68*, *1/00*, *1/44*
U.S. Cl. 252—700 36 Claims

1. A method for generating light which comprises:

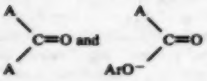
(a) providing in a setting where the light is to be produced a fluorescent compound dispersed in or on one of a surfactant, a micelle, liposome, reversed micelle, microemulsion film, including a monolayer or a polymer which brings the fluorescent compound into a closely spaced relationship with and in admixture with a 1,2-dioxetane which is stable

in the setting where light is to be produced of the formula





wherein ArOX represents an aryl group substituted with an X-oxy group which forms an oxide intermediate 1,2-dioxetane compound when triggered by removing X with an activating agent so that the intermediate 1,2-dioxetane compound decomposes and releases electronic energy to form light and two carbonyl containing compounds of the formula



wherein X is a chemically labile group which is removed by the activating agent to form the unstable oxide intermediate 1,2-dioxetane and wherein A are passive organic groups which allow the light to be produced by the 1,2-dioxetane when X is removed; and

(b) triggering the stable 1,2dioxetane with the activating agent wherein the fluorescent compound accepts the electronic energy generated upon decomposition of the oxide intermediate light than is produced by the triggering of the dioxetane alone.

4,959,183

AERATION APPARATUS

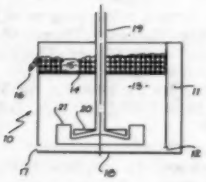
Graeme J. Jameson, 34 Curzon Rd., New Lambton, Australia NSW 2305

Continuation of Ser. No. 132,935, Dec. 15, 1987, abandoned. This application Nov. 28, 1989, Ser. No. 443,068

Claims priority, application Australia, Dec. 16, 1986, PH09531

Int. Cl.[5] B03D *1/16*

U.S. Cl. 261—87 **8 Claims**



1. Aeration apparatus for aerating a given liquid, comprising

a rotor mounted at the lower end of a hollow drive shaft, means to rotate the rotor,

means for receiving and containing such liquid with said rotor immersed therein and with the drive shaft extending substantially vertically upwardly from the rotor,

the rotor comprising a disc located in a plane at right angles to the axis of the shaft and having a plurality of blades depending downwardly from the lower face of the disc,

the interior of the hollow drive shaft opening to the area beneath the disc such that when the rotor is rotated in the liquid by the drive shaft, and air is forced down the hollow drive shaft to issue on the underside of the rotor, the air is broken up into bubbles by the blades on the rotor,

the blades being straight and extending continuously radially outwardly on the underside of the disc from the shaft opening to the periphery of the disc, and the height of the blades increasing continuously with distance from the shaft opening.

4,959,184

METHOD OF PRODUCING SKIN-COVERED FOAMED PLASTIC ARTICLE

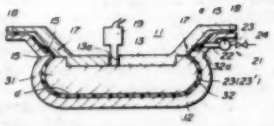
Mikio Akai, and Masami Mori, both of Ayase, Japan, assignors to Ikeda Bussan Co., Ltd., Ayase, Japan

Filed Oct. 20, 1988, Ser. No. 260,218

Claims priority, application Japan, Oct. 31, 1987, 62-276811

Int. Cl.[5] B29C *67/22*

U.S. Cl. 264—40.3 **9 Claims**



1. A method of producing a skin-covered foamed plastic article, comprising the steps of:

(a) preparing a lower mold which has a cavity formed therein;

(b) putting a bag-shaped outer skin member into said cavity, said skin member having a porous inner layer;

(c) sealingly closing said cavity;

(d) pouring a foamable material for the foamed plastic article into the bag-shaped outer skin member, said material being capable of impregnating said inner layer, said material foaming in said cavity and causing pressure in said cavity to gradually increase;

(e) curing said material to provide said article;

(f) allowing pressure in said cavity to increase to a first pressure;

(g) venting gas in said cavity after said first pressure is attained so that a second, lower pressure results; and

(h) allowing pressure in said cavity to return to said first pressure after venting, thereby controlling said pressure such that said curing is carried out under a certain pressure condition which will provide for even penetration of said material into said inner layer.

4,959,185

PROCESS FOR PRODUCING ACOUSTIC CARBON DIAPHRAGM

Yoshihisa Suda, Machashi, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan

Filed Sep. 1, 1988, Ser. No. 239,268

Int. Cl.[5] B29C *41/02*; C01B *31/02*

U.S. Cl. 264—81 **4 Claims**

1. A process for producing an acoustic diaphragm of carbonaceous material, comprising the steps of:

uniformly depositing by a vapor phase technique thermally decomposed carbon generated by thermal decomposition of a carbon-generating material introduced together with

a carrier gas on a surface layer of a diaphragm-shaped base material, and

separating the obtained thermally decomposed carbon deposit from the diaphragm-shaped base material,

said carbon-generating material being selected from the group consisting of benzene, ethylene chloride and ethane chloride.

4,959,186

EXTRUSION PROCESS AND SINGLE-, DUAL- OR MULTIPLE-SCREW EXTRUDER

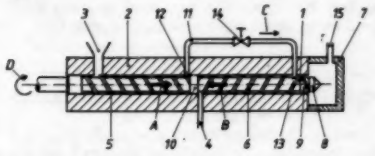
Rüdiger Dollhopf, Herbolzheim, and Bernd Nandzik, Gundelfingen, both of Fed. Rep. of Germany, assignors to Rhodia AG, Freiburg, Fed. Rep. of Germany

Filed Sep. 22, 1988, Ser. No. 247,792

Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3817941

Int. Cl.[5] B29C *47/76*

U.S. Cl. 264—102 **17 Claims**



1. The process of extruding a polymer which consists of guiding said polymer along a rotating single screw which in the first section is left handed and in the second section is right handed, or in the first section is right handed and in the second section is left handed or

a rotating dual screw, one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section left handed and in the second section right handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section right handed and in the second section left handed or

one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section right handed and in the second section left handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section left handed and in the second section right handed,

each of said sections having an inlet and an outlet; the end of said screw or screws being provided with at least a short portion (9, 20), which is left handed or right handed when the last section of the screw or screws is right handed or left handed respectively, whereby the polymer is introduced into the first section, travels in the first section in the direction A and in the second section in the direction B opposite to said direction A, wherein blocking, sealing or throttling is applied between the section in which the polymer is guided in the direction A and the section in which the polymer is guided in the direction B, transferring the polymer from the outlet of said first section to the inlet of said second section by means of a by-pass line, reverse degasifying in a degasification zone at the end of said screw or screws whereby there is not direct contact between the reverse degasifying zone and the polymer, whereby the polymer flows away from said degasifying zone, removing the polymer from said second section at a location between said first and second sections, said short portion being located adjacent said degasification zone, discharging the polymer which has overflown in said short portion (9,20) adjacent said degasifying zone during a shutdown whereby when the process is restarted after a shutdown, said polymer which has overflown is prevented from returning to the polymer being extruded.

7. An extruder for extruding a polymer, the extruder comprising

a rotatable single screw which in the first section is left handed and in the second section is right handed, or in the first section is right handed and in the second second is left handed or

a rotatable dual screw, one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section left handed and in the second section right handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section right handed and in the second section left handed or

one of the screws being in the first section left handed and in the second section right handed, the other screw being in the first section right handed and in the second section left handed or

one of the screws being in the first section right handed and in the second section left handed, the other screw being in the first section left handed and in the second section right handed,

each of said sections having a polymer-charging means and a polymer-discharging means, the extruder further comprising a housing within which said screw rotates or said screws rotate, a drive, a transmission, by-pass line which is arranged for transferring the polymer from the polymer-discharging means of said first section to the polymer-charging means of said second section, a throttling, regulating or metering element located between the first section and the second section or two throttling, regulating or metering elements located between the first sections and the second sections when the screw is a rotatable dual screw and the screws are both in the first section left handed or right handed and in the second section both right handed or left handed respectively, reverse-degasifying means located at the end of said screw or screws whereby the polymer is carried away along said screw or screws, said reverse-degasifying means having no direct contact with the polymer, a short threaded portion (9,20) adjacent said reverse degasifying means which is left handed or right handed when the last section of the screw or screws is right handed or left handed respectively, whereby the polymer being processed is guided away from said reverse degasifying means and the polymer-discharging means of said second section is provided at a location between said first and second sections.

4,959,187

GLYCOLATE ESTER PERACID PRECURSORS

Ronald A. Fong, Modesto; Sheldon N. Lewis, Lafayette; Richard J. Wiersema, Tracy, and Alfred G. Zielske, Pleasanton, all of Calif., assignors to The Clorox Company, Oakland, Calif.

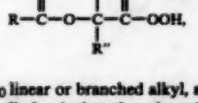
Division of Ser. No. 928,070, Nov. 6, 1986, Pat. No. 4,778,618.

This application Oct. 14, 1988, Ser. No. 258,226

Int. Cl.[5] C07C *309/29, 69/78, 409/26*

U.S. Cl. 260—402 **20 Claims**

1. A peracid of the structure



wherein R is C_{1-20} linear or branched alkyl, alkoxylated alkyl, cycloalkyl, aryl, alkyl substituted aryl; and R' and R" are independently H, C_{1-20} alkyl, aryl, C_{1-20} alkyl, aryl, C_{1-20} alkylaryl, aryl substituted with OH, CO_2 or SO_3, and $NR^{a+}{}_3$, wherein R^a is C_{1-30} alkyl.

4,959,188

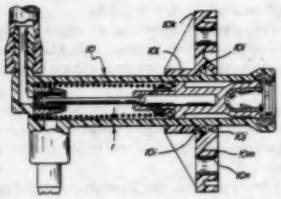
METHOD FOR FORMING A HYDRAULIC CYLINDER ASSEMBLY

Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England

Continuation of Ser. No. 177,313, Apr. 4, 1988, abandoned. This application Jul. 17, 1989, Ser. No. 380,764

Int. Cl.[5] B29C *41/20, 45/14*

U.S. Cl. 264—255 **23 Claims**



1. A method of forming a hydraulic cylinder assembly of the type including a main body cylinder defining a central axial bore, a piston assembly mounted for reciprocal stroking axial movement in the bore and an external integral appendage on said main body cylinder, said method comprising:

(A) forming said main body cylinder with a cylindrical wall having a radial thickness t and an axial length l while simultaneously forming an external wall on the exterior periphery of said cylindrical wall extending totally around the circumference of said cylindrical wall and extending radially outwardly from said exterior periphery and having an axial thickness substantially less than l and not substantially exceeding t; and

(B) forming an appendage and securing said appendage to said external wall in a molding operation to form an external axial wall thickness at the juncture of said appendage with said cylinder body having a value substantially less than l and substantially exceeding t.

4,959,189

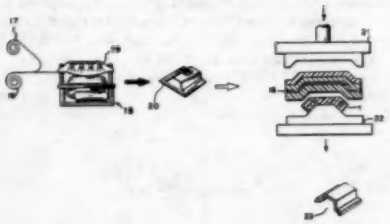
PROCESS FOR FORMING A COMPOSITE STRUCTURE OF THERMOPLASTIC POLYMER AND SHEET MOLDING COMPOUND

Frank Rohrbacher, Wilmington, Del.; Patrick L. Spain, Lowell, Ind., and Roger A. Fahlsing, Park Forest, Ill., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Sep. 26, 1988, Ser. No. 249,152

Int. Cl.[5] B29C *43/18*

U.S. Cl. 264—510 **27 Claims**



1. A process for making a rigid composite structure with a thermoplastic polymeric surface comprising the following steps:

a. thermoforming a thermoplastic polymeric sheet into a three dimensional thermoformed structure, said thermoplastic polymeric sheet having a primary glass transition temperature at least 10° C. greater than a temperature of molding in step (e) below;

b. opening a mold having an upper die and lower die with opposing molding surfaces cooperating to define a mold cavity with one of the dies having a shape corresponding to the three dimensional thermoformed structure,

c. placing the thermoformed structure of step (a) and a charge of a thermosetable sheet molding compound comprising polyester resin, polymerizable monomers, filler pigments and glass fibers on the molding surface of one of the dies,

d. closing the mold so that the dies compress the charge causing it to fill the mold cavity and come into adherence with the thermoformed structure,

e. molding the charge and thermoformed structure under heat and pressure to adhere the sheet molding compound to the thermoformed structure and to cure the sheet molding compound, wherein heating of the mold is at least 10° C. below the glass transition temperature of the thermoplastic polymeric sheet, and

f. opening the dies and removing the resulting composite structure having the thermoformed structure firmly adhered to the cured sheet molding compound.

4,959,190

PROCESS FOR MAKING A PLASTIC CONTAINER BY BLOW MOLDING

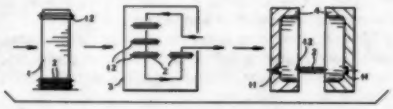
Pierre Pfeiffer, Drulingen; Benoit Cheval, Saverne, and Paul Sigwalt, Drulingen, all of France, assignors to Sotralentz S.A., Drulingen, France

Filed Dec. 16, 1988, Ser. No. 285,901

Claims priority, application Fed. Rep. of Germany, Dec. 18, 1987, 3742993

Int. Cl.[5] B29C *49/04, 49/20*

U.S. Cl. 264—516 **4 Claims**



1. A process for blow molding a container, comprising:

(a) storing a multiplicity of unsorted injection molded one-piece hoop rings of thermoplastic material having outwardly projecting annular collars and which can deviate from a planar shape;

(b) successively transferring the unsorted injection molded one-piece hoop rings of thermoplastic material having outwardly projecting annular collars stored in step (a) to a preheating station and heating each of said hoop rings at said station to a temperature sufficient to relieve stress in each hoop ring, to make the respective hoop ring planar and to enable subsequent blow molding to impart to each hoop ring a circularity correction;

(c) engaging the collar of the respective hoop ring, preheated in step (b) to said temperature, with a manipulator and transferring the hoop ring engaged by the manipulator into an open blow mold having holding means for retaining the preheated ring in said open blow mold;

(d) feeding a tube of thermoplastic material into said open blow mold and through said preheated ring retained in the open blow mold;

(e) closing said blow mold to squeeze off a section of said tube in said blow mold;

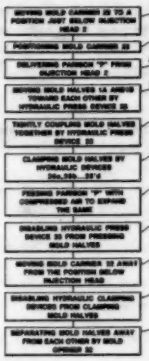
(f) blow-molding said section of said tube in said blow mold by inflating said section with pressurized air to form said container, to correct circularity of the ring in said blow mold, and to secure said ring to said container; and

(g) removing the container formed in step (f) from the blow mold.

4,959,191
METHOD FOR BLOW MOLDING LARGE HOLLOW BODIES

Masanori Yoshioka, Tokyo, and Masafumi Kozai, Yokohama, both of Japan, assignors to Nissan Motor Company, Ltd., Japan

Filed Sep. 29, 1989, Ser. No. 414,545
Int. Cl.[5] B29C 33/24, 49/04, 49/32, 49/56
U.S. Cl. 264—529 3 Claims



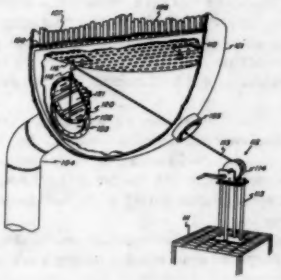
1. A method for blow molding a hollow body, comprising:
(a) moving mold halves to a first position just below a material injection head while keeping said mold halves separated;
(b) injecting a fluidized plastic material from said injection head to produce a tubular parison between the separated mold halves at said first position;
(c) moving said mold halves toward each other with said parison therebetween and coupling them together with a first given pressing force, the coupled mold halves defining a cavity and said parison being pinched by the coupled mold halves;
(d) then clamping said mold halves together with a second given pressing force;
(e) feeding the interior of said parison with compressed air to expand the same into engagement with walls of the cavity of the coupled mold halves, said compressed air being set at a first given magnitude;
(f) reducing the magnitude of said compressed air to a second given magnitude;
(g) then removing said first given pressing force applied to said mold halves at the step (c) while maintaining the coupling of said mold halves with said second clamping force;
(h) moving the clamped mold halves from said first position to a second position which is at a distance from said first position; and then
(i) removing said second given pressing force applied to said mold halves at the step (d).

4,959,192
NOZZLE DAM TRANSLOCATING SYSTEM

Mark H. Trundle, Signal Mountain, Tenn., and William C. Jones, Tunnel Hill, Ga., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Filed Jun. 13, 1989, Ser. No. 365,641
Int. Cl.[5] G21C 19/00
U.S. Cl. 376—260 9 Claims

1. A nozzle dam translocating system for remotely relocating nozzle dam means from outside the confines of nuclear reactor steam generator channel head means to coupled association with nozzle holddown ring means within the confines of said channel head means and for the converse thereof to thereby substantially minimize personnel exposure to radiation and/or radioactive contamination environment within said channel head means, said system comprising:
(a) nuclear reactor steam generator channel head means having manway means and nozzle holddown ring means provided on the lower wall thereof, and tubesheet means generally defining a horizontal plane comprising the upper boundary thereof;
(b) tubesheet tackle means adapted for remote location and attachment to a first predetermined situs, said first predetermined situs disposed on said tubesheet means;
(c) lifting means adapted for operative association with both said tubesheet tackle means and a second predetermined situs, said second situs located outside the confines of said channel head means;
(d) nozzle dam means adapted in folded mode for introduction through said manway means and into said channel head means;
(e) nozzle dam strapping means adapted for securing to said nozzle dam means either prior or subsequent to introduction thereof through said open manway means and into said channel head means, and further adapted for coupling with said lifting means and said tubesheet tackle means, whereby subsequent actuating of said lifting means elevates said folded nozzle dam means adapted in folded



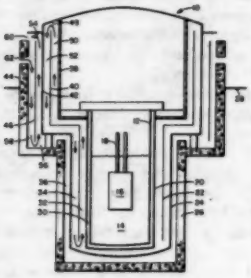
mode to effect the unfolding thereof to the full open position and the continued actuating of said lifting means translocates said fully opened nozzle dam means until the center point thereof is substantially vertically disposed over the center point of said nozzle holddown ring means and in juxtaposition therewith;
(f) remote determination orientation means adapted for inspection and/or adjustment of said nozzle dam means relative to the angular rotation, or the horizontal vector displacement, or both, of said nozzle dam means relative to said nozzle holddown ring means;
(g) bolt starting tool means adapted for remotely securing, at least temporarily, said nozzle dam means and later mentioned nozzle dam center section means, to said nozzle holddown ring means;
(h) nozzle dam center section means adapted for introduction through said manway means and into said channel head means and further adapted for remote operative association with at least a portion of said nozzle dam strapping means whereby coupling of said nozzle dam strapping means with said lifting means and the subsequent actuating thereof effects positioning and engagement of said center section means with said nozzle dam means; and
(i) torquing means adapted for securing said nozzle dam means to said nozzle holddown ring and said nozzle dam center section to said nozzle holddown ring.

4,959,193

INDIRECT PASSIVE COOLING SYSTEM FOR LIQUID METAL COOLED NUCLEAR REACTORS

Anstein Hunsbedt, Los Gatos, and Charles E. Boardman, Saratoga, both of Calif., assignors to General Electric Company, San Jose, Calif.

Filed May 11, 1989, Ser. No. 350,187
Int. Cl.[5] G21C *15/18*
U.S. Cl. 376—299 15 Claims



10. A passive cooling system for liquid metal cooled nuclear reactors having a pool of liquid metal coolant with the heat generating fissionable fuel core substantially immersed in said pool of liquid metal coolant, the passive cooling system including a combination of spaced apart side-by-side partitions in generally concentric arrangement and providing for intermediate fluid circulation and heat transfer therebetween, comprising:

a reactor vessel for continuing a pool of liquid metal coolant with a fuel core substantially immersed therein, a sidewall of the reactor vessel forming an innermost first partition;

a guard vessel substantially surrounding the reactor vessel in spaced apart relation having a side wall forming a second partition;

a containment vessel substantially surrounding the guard vessel in spaced apart relation having a side wall forming an outermost third partition;

a concrete silo substantially surrounding the containment vessel in spaced apart relation;

a multiplicity of baffles extending between the first and second partitions formed by the side walls of the spaced apart reactor and guard vessels dividing the space intermediate said partitions into several channels for fluid circulation and in open communication adjacent to the lowermost portion of said vessels whereby the fluid circulating channels are interconnected;

a closed circulating fluid flow course for recirculating fluid coolant in a recycling path comprising between the first and second partitions formed by the side walls of the spaced apart reactor and guard vessels; and

a second circulating fluid flow course open to the ambient atmosphere adjoining at least a portion of the closed circulating flow course extending above the reactor vessel and consisting of at least one downcomer duct having an opening to the atmosphere in an upper area thereof and at least one adjacent riser duct having an opening to the atmosphere in an upper area thereof, said riser duct abutting at least a portion of the closed circulating flow course extending above the reactor vessel, the adjacent downcomer and rise ducts being joined together in fluid communication in their lower areas to provide an open circuit for the passage of ambient air from the atmosphere into and downward through a downcomer duct and around back up though a riser duct and out into the atmosphere.

4,959,194

HIGH STRENGTH URANIUM-TUNGSTEN ALLOY PROCESS

Paul S. Dunn, Santa Fe; Haskell Sheinberg; Billy M. Hogan, both of Los Alamos, all of N. Mex.; Homer D. Lewis, Bayfield, Colo., and James M. Dickinson, Los Alamos, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 28, 1989, Ser. No. 329,901
Int. Cl.[5] B22F *7/00*
U.S. Cl. 419—46 15 Claims

1. A method for making an alloy having a coherent shape which is comprised of uranium and tungsten where the amount of tungsten present in the alloy is from about 4 wt % to about 35 wt %, said method comprising:

a. placing tungsten powder and uranium in a container;

b. heating said uranium and tungsten to a temperature which is above the melting point of uranium and below the melting point of tungsten to form a molten mixture containing tungsten powder;

c. holding said molten mixture at said temperature for a sufficiently long time period to effect degassing and homogenization of the mixture; and

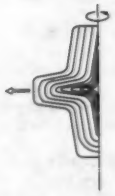
d. discharging said molten mixture from said container into a mold.

4,959,195

METHOD OF FORMING LARGE-SIZED ALUMINUM ALLOY PRODUCT

Jun Kusui, Yokaichi; Masahiko Kawai, Nara; Yusuke Odani, Higashiosaka, and Yoshinobu Takeda, Suita, all of Japan, assignors to Sumitomo Electric Industries, Ltd. and Toyo Aluminium Kabushiki Kaisha, both of, Japan

Filed May 4, 1989, Ser. No. 347,879
Claims priority, application Japan, May 12, 1988, 63-115625
Int. Cl.[5] B22F *1/00*
U.S. Cl. 419—67 7 Claims



1. A process for preparing a large-sized P/M aluminum alloy produce comprising:

extruding, at a temperature between 350 and 500° C. and at an extrusion ratio of 2 to 5, aluminum alloy powder consisting essentially of (a) 5 to 30% by weight of Si, (b) 0.5 to 10% by weight of at least one species selected from the group consisting of Cu, Mg, Fe, Ni, Cr, Mn, Mo, Zr and V with the proviso that the total amount of these species cannot exceed 30% by weight, and (c) aluminum in a remaining amount; and

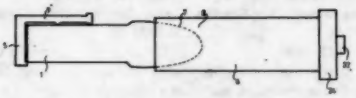
forging the extruded material at a temperature of 400° to 530° C.

4,959,196

DEVICE FOR BLOOD SAMPLING AND ANALYSIS

Claude Moisson, Nogent le Phaye, France, assignor to Biovallees, Monastier Sur Gazelle, France

Filed Dec. 20, 1988, Ser. No. 286,798
Claims priority, application France, Dec. 21, 1987, 87 17811
Int. Cl.[5] G01N 21/75, 33/72; A61B 5/14, 5/20
U.S. Cl. 422—68.05 11 Claims



1. A device for sampling blood and evaluating desired concentrations of substances therein, comprising:

an auto-pricker;

a plurality of strips, said strips including a reactive area having a color which varies according to the concentration of the substance being evaluated;

a reflectometer comprising:

(a) reading system means for supplying information about said reactive area;

(b) processing system means for receiving and processing said information supplied by said reading system means, said processing system means comprising microprocessor and read-only memory means for converting said information supplied by said reading system into the desired concentration; and

(c) display system means for directly displaying the desired concentration; and

magazine means for holding said strips, said magazine means being integral with said auto-pricker and having holder means for receiving one of said strips externally of said reflectometer before said one of said strips has received the sampled blood;

said auto-pricker being separable from said reflectometer during pricking, and said auto-pricker and said reflectometer including first integration means for integrating said auto-pricker and said reflectometer when at rest and second integration means for integrating said auto-pricker and said reflectometer during reading of the color of said reactive area.

4,959,197

FILTER CANISTER FOR IMMUNOASSAYS

Bharat S. Parekh, Pleasant Hill; William F. Link, Richmond, Stephen R. Coates, Orinda, and George B. La Motte III, Larkspur, all of Calif., assignors to Bio-Rad Laboratories, Inc., Hercules, Calif.

Filed Sep. 7, 1988, Ser. No. 241,444
Int. Cl.[5] B01L 11/00, 3/00; C12M 1/16, 1/20
U.S. Cl. 422—101 5 Claims

1. A canister for holding a fluid-permeable membrane for use in a biospecific binding assay, comprising:

a cup-shaped receptacle closed at the bottom and sides and open at the top;

a fluid-permeable membrane;

a cap shaped to mate with said receptacle, said cap having a central opening sized to receive said fluid-permeable membrane and surrounded by a raised surface;

removable means for securing said fluid-permeable membrane to said cap across said opening; and

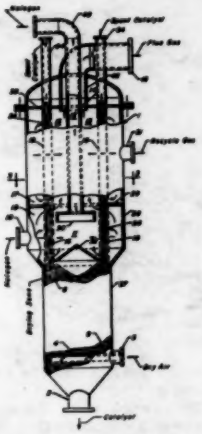
means for venting the interior of said receptacle to the atmosphere when said cap and said receptacle are joined.

4,959,198

DOWNWARDLY FORCED PARTICLE BED FOR GAS CONTACTING

William J. Koves, Hoffman Estates, Ill., assignor to UOP, Des Plaines, Ill.

Filed Oct. 26, 1989, Ser. No. 426,907
Int. Cl.[5] B01J 8/12
U.S. Cl. 422—220 6 Claims



1. Apparatus for contacting particles and simultaneously withdrawing said particles, said apparatus comprising:

(a) a vessel;

(b) a fluid inlet;

(c) a fluid outlet;

(d) an inlet screen and an outlet screen disposed vertically within said vessel defining a particle chamber and arranged to confine a vertically-elongated bed of particles through which fluid passes;

(e) a plurality of outlet apertures defined by said outlet screen and arranged such that the open cross sectional area provided by said outlet apertures varies progressively along the length of said outlet screen, the top of said outlet screen has a minimum open cross sectional area and the bottom of said outlet screen has a maximum open cross sectional area, such that the total resistance to fluid flow of said outlet screen varies from a maximum at the top of the outlet screen to a minimum at the bottom of the outlet screen;

(f) a plurality of inlet apertures defined by said inlet screen and arranged such that the open cross sectional area provided by said inlet apertures varies progressively along the length of said outlet screen, the top of said inlet screen has a maximum open cross sectional area, the bottom of said inlet screen has a minimum open cross sectional area, such that the total resistance to fluid flow of said inlet screen varies from a minimum resistance at the top of the inlet screen to a maximum resistance at the bottom of the inlet screen, and the upper extent of said inlet apertures are located above the upper extent of said outlet screen apertures by a fixed offset distance;

(g) a fluid collection chamber defined in part by at least one of said vessel and said outlet screen;

(h) a fluid distribution chamber defined in part by at least one of said vessel and said inlet screen;

(i) means for adding particles to the top of said particle chamber; and,

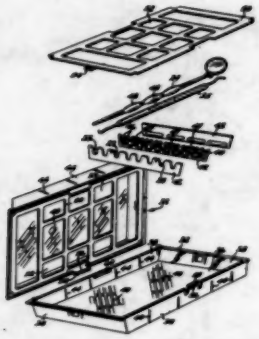
(j) means of withdrawing particles from the bottom of said particle chamber.

4,959,199

AUTOCLAVABLE MODULAR CASSETTE AND TRAY FOR HOLDING DENTAL INSTRUMENTS

Charles A. Brewer, 105 Via Wazier, Newport Beach, Calif. 92660

Filed Feb. 19, 1988, Ser. No. 157,879
Int. Cl.[5] A61L 2/20; B65D 45/16, 51/16
U.S. Cl. 422—300 **20 Claims**



11. An autoclavable modular cassette for holding dental instruments comprising:

two substantially identical trays, the trays having hinge means for removably assembling the trays to one another, each tray having a main plate having a plurality of apertures wherethrough a liquid can be sprayed into and can be drained out of the tray, and at least a pair of parallel side walls, disposed on opposite edges of the main plates;

a plurality of ribs which are mounted into each tray to occupy substantially parallel positions therein substantially transverse to the general longitudinal axis of the tray, and extending substantially from side wall to side wall, one of the trays including clamping means for holding a plurality of elongated dental instruments in positions substantially transverse to the ribs, the clamping means including

substantially Y shaped posts protruding upwardly from one of the ribs;

the trays and the ribs being made of autoclavable plastic material whereby a separate set of dental instruments can be placed into each tray, and whereby the assembled trays forming on the enclosure containing two sets of dental instruments can be cleaned with liquid and ultrasound and can be autoclaved.

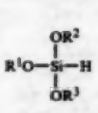
4,959,200

PROCESS FOR MANUFACTURING SILANE

Shin-ichi Inaba, and Hideki Nagahama, both of Minamata, Japan, assignors to Chisso Corporation, Japan

Filed Feb. 4, 1988, Ser. No. 152,306
Claims priority, application Japan, Feb. 10, 1987, 62-28768
Int. Cl.[5] C01B 33/04
U.S. Cl. 423—347 **17 Claims**

1. A process for manufacturing silane comprising subjecting a trialkoxysilane in the gaseous state, said trialkoxysilane represented by the general formula (A)



(A)

wherein each of R^1, R^2 and R^3 is an alkyl group having 1 to 3 carbon atoms, to a disproportionation reaction in a phase consisting of the gaseous phase by supplying said trialkoxysilane to a reaction zone containing a catalyst which is an oxide of a metal in the third period of the periodic table.

4,959,201

GREEN DIAMOND AND METHOD OF PRODUCING THE SAME

Shuichi Satoh, and Kazuwo Tsuji, both of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Dec. 30, 1988, Ser. No. 292,754
Claims priority, application Japan, Jan. 13, 1988, 63-5573
Int. Cl.[5] C01B 31/06
U.S. Cl. 423—446 **10 Claims**

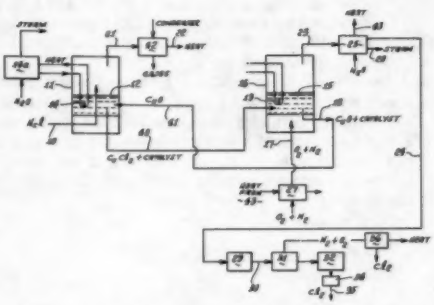
1. A green diamond comprising Ib-type diamond crystals with a nitrogen content within the range of 5×10^{16} to 3×10^{19} atoms/cm^3, an absorption coefficient of H2 centers at a wavelength of 800 nm is 0.3 to 6 cm^{-1}, an absorption coefficient of Ib type nitrogen at a wavelength of 500 nm within the range of 0.05 to 1.5 cm^{-1}, and absorption coefficients of H3 centers, H4 centers, N-V centers and GR1 centers in the visible range of not more than 0.2 cm^{-1}, said diamond having a brilliant green transparency.

4,959,202

RECOVERY OF CHLORINE FROM HYDROGEN CHLORIDE BY CARRIER CATALYST PROCESS

Ronald G. Minet, South Pasadena; Theodore T. Tsotsis, Huntington Beach, and Sidney W. Benson, Brentwood, all of Calif., assignors to Medalert Incorporated, South Pasadena, Calif.

Filed May 31, 1989, Ser. No. 359,630
Int. Cl.[5] G01B 7/04
U.S. Cl. 423—502 **14 Claims**



1. In a process of recovering chlorine from a stream of hydrogen chloride, the steps that include:

(a) providing a first fluidized bed of a carrier catalyst cupric oxide in a first reaction zone within a first reactor,

(b) supplying hydrogen chloride in a first stream to said zone for fluidizing said first bed and for exothermic reaction with cupric oxide in said bed to produce cupric chloride, water and heat, removing cupric chloride from said zone in a second stream, and removing water from said zone and removing heat from said zone,

(c) feeding said second stream to a second reaction zone within a second reactor, and providing a second fluidized bed of cupric chloride in said second reaction zone, and

(d) supplying oxygen in a third stream to said second zone for fluidizing said second bed and for endothermic reaction with cupric chloride in said second bed at elevated temperatures between 300° and 360° C. to produce cupric oxide and chlorine, removing chlorine from said second zone in a fourth stream, and removing cupric oxide from said second bed for re-use as a catalyst to produce cupric

chloride, by direct recycling to the first fluidized bed of said cupric oxide removed from the second fluidized bed.

4,959,203

PREPARATION OF COPPER ARSENATE

Susan B. Knoerr, Castlegar, Canada, and Robert G. Robins, Lindfield, Australia, assignors to Cominco Ltd., Vancouver, Canada

Filed Aug. 28, 1989, Ser. No. 399,195
Int. Cl.[5] C01G 28/02, 3/00
U.S. Cl. 423—602 12 Claims

1. In a method for the preparation of copper arsenate comprising the steps of adding a solution of water soluble arsenate to a copper sulfate solution, at least one of the arsenate solution and the copper sulfate solution containing sludge-forming impurities, to form a copper and arsenic-containing solution without precipitating copper arsenate, the amount of copper and the amount of arsenic in said copper and arsenic-containing solution being such that copper arsenate can be formed; causing said impurities to precipitate at a value of pH less than about 2.2 at which said sludge-forming impurities precipitate and in which copper arsenate does not precipitate; separating precipitated impurities from said copper and arsenic-containing solution; neutralizing said copper and arsenic-containing solution in a precipitation to precipitate copper arsenate; and recovering copper arsenate substantially free from said sludge-forming impurities, and having a water content, the improvement comprising lowering said water content by adding to said copper and arsenic-containing solution an amount of chromium, soluble in said copper and arsenic-containing solution in the range of about 0.005 to 0.250 gram of chromium per liter of said copper and arsenic-containing solution.

4,959,204

ORAL COMPOSITIONS

Leslie D. Ryan, Millville, Ohio, assignor to The Proctor & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 625,267, Jun. 27, 1984, Pat. No. 4,663,154, which is a continuation of Ser. No. 492,520, May 9, 1983, Pat. No. 4,472,373. This application Feb. 2, 1987, Ser. No. 10,253
The portion of the term of this patent subsequent to May 4, 2004, has been disclaimed.
Int. Cl.[5] A61K 7/22
U.S. Cl. 424—54 2 Claims

1. A method of inhibiting plaque comprising the step of contacting plaque in the oral cavity with an effective amount of composition comprising a dentifrice carrier suitable for use in the oral cavity and from about 0.05% to about 7% of an antimicrobial selected from the group consisting of the fluoride, chloride, bromide and iodide salts of N-tetradecyl-4-ethyl pyridinium.

4,959,205

COMPOSITION AND METHOD FOR TREATMENT OF DERMAL INFLAMMATION

Maureen Brunner, San Francisco, and Howard Palefsky, Atherton, both of Calif., assignors to Collagen Corporation, Palo Alto, Calif.

Filed Mar. 23, 1989, Ser. No. 327,488
Int. Cl.[5] A61K 7/40, 7/42, 31/56
U.S. Cl. 424—59 6 Claims

1. A topical composition for treating dermal inflammation, comprising:

0.25%–0.5% hydrocortisone;

an effective protective amount of a water-soluble sunscreen agent; and

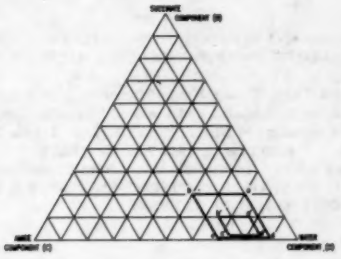
a pharmaceutically acceptable carrier.

4,959,206

PEARLING AGENT DISPERSION

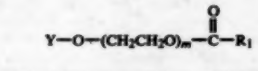
Angel R. Noguera, Barcelona; Carlos C. Planells, Sant Cugat del valles, and Masaki Itabashi, Barcelona, all of Spain, assignors to KAO Corporation, Tokyo, Japan

Filed Dec. 23, 1988, Ser. No. 289,251
Claims priority, application Japan, Dec. 28, 1987, 62-332792
Int. Cl.[5] A61K 7/06; B01J 13/00
U.S. Cl. 424—70 4 Claims



1. A pearling agent dispersion comprising as essential components:

(A) 10 to 40% by weight of a fatty acid glycolic ester represented by the following formula (I):

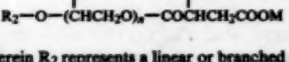


(I)

wherein R_1 represents a linear or branched, saturated or unsaturated hydrocarbon group of a C_{13-21} carbon atom content, Y represents a hydrogen atom or a

group, m indicates a value of 1 3, which is the average number of ethylene oxide group addition moles,

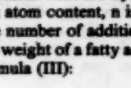
(B) 0.8 to 16% by weight of an alkylsulfosuccinate or a polyoxyalkylenealkylsulfosuccinate represented by the following formula (II):



(II)

wherein R_2 represents a linear or branched alkyl group of a C_{8-20} carbon atom content, R_3 represents a hydrogen atom or a methyl group, M represents an alkali metal, an alkaline earth metal, an ammonium ion, an alkyl group-substituted ammonium with the alkyl group having a C_{1-3} carbon atom content, or a hydroxy alkyl group-substituted ammonium with the hydroxy alkyl group having a C_{2-3} carbon atom content, n is a value of 0 to 8, which is the average number of addition moles,

(C) 8 to 24% by weight of a fatty acid dialkanol amide of the following formula (III):



(III)

wherein R_4 represents a linear or branched, saturated or unsaturated hydrocarbon group of a C_{7-17} carbon atom

content, and R_5 and R_6 independently represent a group $-C_2H_4$ or $-C_3H_6$, and

(D) 50 to 81% by weight of water; and wherein the ratio of the components (B), (C), and (D) lies within a region defined by straight lines linking the following four points of a three-component trigonometric diagram:

a'[(B)=10 : (C)=13 : (D)=77],

b'[(B)=10 : (C)=25 : (D)=65]

c'[(B)=2 : (C)=25 : (D)=73], and

d'[(B)=2 : (C)=13 : (D)=85].

4,959,207

DEODRANT COMPOSITION, DEODRANT RESIN COMPOSITION AND DEODRANT RESIN SHAPED ARTICLE

Tsunehisa Ueda, Zushi; Kouji Miyazaki, Yokohama; Tadao Natsuume, Yokoshuka, and Yoshiaki Miki, Yokohama, all of Japan, assignors to Nippon Zeon Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1988, Ser. No. 163,087

Claims priority, application Japan, Mar. 2, 1987, 62-47337; Mar. 2, 1987, 62-47339; Aug. 7, 1987, 62-197566; Sep. 10, 1987, 62-227378; Sep. 11, 1987, 62-228051

Int. Cl.[5] A61L *2/18*

U.S. Cl. 424—76.1 12 Claims

1. A deodorant composition comprising (A) a compound having an acid anhydride group in the molecule selected from the group consisting of (1) a polymer having units derived from an alpha, beta-unsaturated dicarboxylic acid anhydride, (2) a Diels-Alder addition reaction product of an alpha, beta-unsaturated dicarboxylic acid anhydride with an olefin its derivative, and (3) an anhydride of an aliphatic, alicyclic or aromatic monocarboxylic or a polycarboxylic acid anhydride, and (4) an ene reaction product of an alpha, beta-unsaturated dicarboxylic acid anhydride with an olefin and its derivative, and (B) a copper salt of an inorganic acid or a copper salt of a monomeric organic acid; and when the compound (A) having an acid anhydride group in the molecule is the polymer (1) having units derived from an alpha, beta-unsaturated dicarboxylic acid anhydride, said polymer is a homopolymer of an alpha, beta-unsaturated dicarboxylic acid anhydride, a copolymer of an alpha, beta-unsaturated dicarboxylic acid anhydride with a monomer copolymerizable therewith selected from the group consisting of styrene, alpha-methyl-styrene, vinyltoluene, isobutene, 1-butene, 2-butene, 1-pentene, 2-pentene, 2-methyl-1-butene, 2-methyl-2-butene, 1-hexene, 2,2,4-trimethyl-1-pentene, 2,2,4-trimethyl-2-pentene, 1-decene, 1-octadecene, cyclopentene, cyclohexene, cyclooctene, butadiene, isoprene and piperylene, or said homopolymer or copolymer in which a portion of said acid anhydride groups are converted to carboxyl groups.

4,959,208

ACTIVE AGENT DELIVERY DEVICE

Paritosh M. Chakrabarti, Pittsburgh, Pa.; John M. Denison, Westmount, Canada; Harlan B. Johnson, Rittman; Malcolm Korach, Akron, both of Ohio; Dennis D. Leatherman, Pittsburgh, Pa.; Linda P. Reinhardt, Lake Charles, La.; Richard A. Schwarz, Akron, and Robert B. Simmons, Norton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 250,015, Sep. 27, 1988, which is a continuation-in-part of Ser. No. 110,147, Oct. 19, 1987, abandoned. This application Oct. 28, 1988, Ser. No. 264,242

The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.

Int. Cl.[5] A61K *31/74, 31/765, 9/50, 9/14*

U.S. Cl. 424—78 14 Claims

1. An active agent delivery device which releases active agent over a prolonged period of time comprising:

(a) microporous material comprising:

(1) a matrix consisting essentially of essentially linear ultrahigh molecular weight polyolefin which is essentially linear ultrahigh molecular weight polyethylene having an intrinsic viscosity of at least about 18 deciliters/gram, essentially linear ultrahigh molecular weight polypropylene having an intrinsic viscosity of at least about 6 deciliters/gram, or a mixture thereof,

(2) finely divided particulate substantially water-insoluble filler, of which at least about 50 percent by weight is siliceous, distributed throughout said matrix, said filler constituting from about 50 percent to about 90 percent by weight of said microporous material, and

(3) a network of interconnecting pores communicating throughout said microporous material, said pores constituting more than 35 percent by volume of said microporous material.

(b) a releasable active agent or precursor thereof associated with at least a portion of said filler.

4,959,209

USE OF N,N-DIETHYL-M-TOLUAMIDE AND/OR THE ETHYL ESTER OF 2-METHYL-3-PENTENOIC ACID AS INSECT ATTRACTANTS

Richard A. Wilson, Westfield, N.J.; Jerry F. Butler, Gainesville, Fla.; Donald Withycombe, Lincroft, N.J.; Braja D. Mookherjee, Holmdel, N.J.; Ira Katz, West Long Branch, N.J., and Kenneth R. Schrankel, Tinton Falls, N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation of Ser. No. 213,683, Jun. 30, 1988, Pat. No. 4,880,625, which is a continuation of Ser. No. 26,979, Mar. 17, 1987, Pat. No. 4,808,403. This application Aug. 28, 1989, Ser. No. 399,825

The portion of the term of this patent subsequent to Feb. 28, 2006, has been disclaimed.

Int. Cl.[5] A01N *25/00*

U.S. Cl. 424—81 5 Claims

1. A method of attracting *Musca domestica L.* (Diptera:Muscidae) to an insect trap comprising the step of exposing the environment surrounding said trap to an insect attractant-containing polymer which consists of a mixture of a polymer and from about 1% up to about 45% by weight of said polymer of a composition of matter selected from the group consisting of:

(i) N,N-diethyl-m-toluamide;

(ii) the mixture of N,N-diethyl-m-toluamide and the ethyl ester of 2-methyl-3-pentenoic acid;

(iii) a mixture of N,N-diethyl-m-toluamide and dimethyl disulfide; and

(iv) a mixture of N,N-diethyl-m-toluamide, the ethyl ester of 2-methyl-3-pentenoic acid and dimethyl disulfide

said polymer being compatible with said composition of matter.

4,959,210

TREATMENT OF GENITAL WARTS WITH A COMBINATION OF LIQUID NITROGEN AND RECOMBINANT DNA HUMAN ALPHA INTERFERON

Kenneth A. Smiles, Windsor, N.J.; Edwin A. Peets, New York, and Daniel J. Tanner, Brooklyn, both of N.Y., assignors to Schering Corporation, Kenilworth, N.J.

Filed Nov. 1, 1988, Ser. No. 265,612

Int. Cl.[5] A61K *37/66*

U.S. Cl. 424—85.7 10 Claims

1. A method of treating condylomata acuminata infections in patients in need of such treatment comprising administering to each lesion an effective amount of a cryosurgical agent, followed by administration to each lesion immediately thereafter an effective amount of human alpha interferon.

4,959,211

PROCESS FOR THE PRODUCTION ON AN ANTIVIRAL VACCINE, PARTICULARLY ANTI-FOOT AND MOUTH DISEASE VACCINE

Jorge H. Lombardo, Itvzaingo 865, 1244 Moreno; Eduardo E. Smolko, Rioja 2897, (1636) Olivos, Buenos Aires; Rodolfo A. Ugalde, Chile 740, Haedo Buenos Aires 1706, and Scholein Rivenson, Vidt 2027, 4th-10-Buenos Aires, all of Argentina

Filed Apr. 22, 1988, Ser. No. 184,784

Claims priority, application Argentina, Apr. 28, 1987, 307406

Int. Cl.[5] A01N *63/00*

U.S. Cl. 424—93 17 Claims

1. A process for preparing an antiviral viccine, paticularly anti-foot and mouth disease vaccine, which process comprises the steps of:

(a) radiating an animal free of active virus with ionizing radiations;

(b) innoculating active virus into said animal;

(c) maintaining the animal under controlled sterile conditions and under antibiotic administration until a high viral proliferation is obtained;

(d) after animal's death, cooling the cadaver;

(e) withdrawing skin and viscerae from the animal cadaver;

(f) crushing the soft portions of the remaining parts of the cadaver with the aid of a saline solution in order to obtain a visually homogeneous mixture;

(g) mechanically separating an active viral suspension from said mixture;

(h) transforming the active viral suspension into an inactive viral suspension through the application of ionizing radiation on said suspensions, which are maintained at a temperature substantially lower than 0° C.; and

(i) formulating the vaccine from said inactive viral suspension.

4,959,212

OXIDIZING-ENERGIZING COMPOSITION AND METHOD FOR THE TREATMENT OF DIABETES

Alexandra Stancesco, 1184 Main St., Apt. 75, River Edge, N.J. 07661; Apostol Spiliadis, 5-D Patton Dr., Bloomfield, N.J. 07003, and Theodore Dumas, 977 Waterloo Street, Ontario, London, Canada N 6 A 2 x 4

Filed Jun. 22, 1988, Ser. No. 209,877

Int. Cl.[5] A61K *37/62, 31/52, 31/505*

U.S. Cl. 424—94.1 21 Claims

1. A non-toxic, oxidizing energizing composition suitable for use as an accelerator of the carbohydrate oxidative degradation metabolic process or of the direct oxidation of glucose which consists essentially of, by weight, (A) 10% to 95% of flavine adenine dinucleotide coenzyme (FAD) and (B) 5% to 90% of a coenzyme or enzyme selected from the group consisting of flavine mononucleotide coenzyme (FMN), ubiquinone coenzyme (UBQ), uridine 5'-triphosphate coenzyme (UTP), triphosphopyridine nucleotide coenzyme (TPN), diphosphopyridine nucleotide coenzyme (DPN), adenosine triphosphate coenzyme (ATP), uridine diphosphate glucose coenzyme (UDPG), guanosine 5'-triphosphate coenzyme (GTP), glucose oxidase enzyme (GOD) and mixtures thereof; and, (C) 0 % to less than 50% of an enzyme selected from the group consisting of fructosediphosphate aldolase, phosphofructokinase, hexokinase, glucokinase, glucose 6-phosphate dehydrogenase, glucose phosphate isomerase, D-glucose-phosphotransferase and mixtures thereof, said composition being effective to reduce the blood glucose concentration in a human body afflicted with diabetes.

4,959,213

PHARMACEUTICAL COMPOSITION FOR TREATMENT AND/OR PREVENTION OF DISEASES OF THE SKIN INVOLVING AN INFLAMMATORY PROCESS

Joel Brod, and Michel Kermici, both of Paris, France, assignors to L'Oreal, Paris, France

Continuation-in-part of Ser. No. 717,182, Mar. 14, 1985, abandoned. This application Sep. 14, 1987, Ser. No. 95,897

Claims priority, application Luxembourg, Nov. 9, 1983, 85081

Int. Cl.[5] A61K *37/102, 35/36;* C07K *15/20*

U.S. Cl. 514—21 6 Claims

1. A pharmaceutical composition for the treatment and prevention of erythema and acne comprising in a pharmaceutically acceptable carrier from about 1 to about 10 weight percent, based on the total weight of said composition, of a delipidized and purified keratin polymer obtained from an animal starting material comprising keratin, said keratin polymer (a) being freed from cells, (b) containing from about 90 to about 95 weight percent keratin material based on the total weight of said keratin polymer and (c) containing at most 0.1 weight percent lipid based on the total weight of said keratin polymer.

4,959,214

PROCESSES FOR PREPARATION OF ALOE PRODUCTS PRODUCTS PRODUCED THEREBY AND COMPOSITIONS THEREOF

Bill H. McAnalley, Grand Prairie, Tex., assignor to Carrington Laboratories Inc., Irving, Tex.

Division of Ser. No. 136,193, Dec. 27, 1987, Pat. No. 4,917,890, which is a division of Ser. No. 869,261, Jun. 6, 1986, Pat. No. 4,735,935, which is a continuation-in-part of Ser. No. 810,025, Dec. 17, 1985, abandoned, which is a continuation-in-part of Ser. No. 754,859, Jul. 12, 1985, abandoned, which is a continuation-in-part of Ser. No. 750,321, Jun. 28, 1985, abandoned, which is a continuation-in-part of Ser. No. 649,967, Sep. 12, 1984, abandoned, which is a continuation of Ser. No. 375,720, May 7, 1982, abandoned. This application Jan. 23, 1989, Ser. No. 301,030

Int. Cl.[5] A61K *35/78*

U.S. Cl. 424—195.1 15 Claims

1. A product, comprising: an ethanol precipitation of substantially anthraquinone-free juice of the aloe plant wherein said precipitation product is substantially nondegradable and lyophilized.

4,959,215

IFOSFAMIDE-MESNA LYOPHILIZATE AND PROCESS FOR ITS PREPARATION

Dieter Sauerbier, Werther; Otto Isaac, Hanau, and Wolfgang P. Brade, Wehrheim, all of Fed. Rep. of Germany, assignors to Asta Pharma AG, Frankfurt am Main, Fed. Rep. of Germany

Filed Mar. 20, 1989, Ser. No. 325,883

Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809337

Int. Cl.[5] A61K *9/00*

U.S. Cl. 424—422 8 Claims

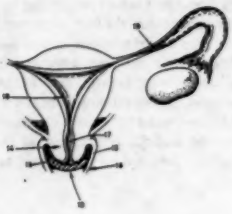
1. A lyophilized preparation consisting of ifosfamide, 0.05–1.0 parts by weight of sodium-2-mercaptoethane sulfonate and 0.1 to 17 parts by weight of a hexitol, the mesna and hexitol being in each case based on one part by weight of ifosfamide, as well as 0 to 16.9 parts by weight, based on 1 part by weight of ifosfamide, or pharmaceutical auxiliary substances.

4,959,216

CONTRACEPTIVE METHODS AND DELIVERY SYSTEMS THEREOF

Brian Daunter, Bellbowrie, Australia, assignor to University of Queensland, Queensland, Australia

Continuation-in-part of Ser. No. 819,510, Dec. 18, 1985, abandoned. This application Dec. 17, 1987, Ser. No. 134,263
Claims priority, application Australia, Apr. 19, 1984, PG4658
Int. Cl.[5] A61K *33/34*; A61M *31/00*
U.S. Cl. 424—430 28 Claims



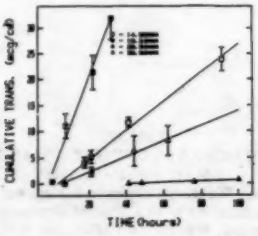
18. A contraceptive preparation for living animals to be introduced into the vaginal and/or cervical regions of the female reproductive system, said contraceptive preparation comprising (i) a metal chelate and (ii) a suitable reducing agent, wherein said preparation, when introduced into said regions, releases metal ions which complex with the cervical mucus to form an impenetrable barrier to spermatozoa.

4,959,217

DELAYED/SUSTAINED RELEASE OF MACROMOLECULES

Lynda M. Sanders, Palo Alto, Calif., and Abraham Domb, Brookline, Mass., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed May 22, 1986, Ser. No. 866,042
Int. Cl.[5] A61K *9/24*
U.S. Cl. 424—473 48 Claims



1. A drug delivery device for the controlled administration of a macromolecular drug, said device comprising:

(a) a pharmaceutically acceptable carrier;

(b) a macromolecular drug having a molecular weight greater than about 1,000 mixed with said carrier; and

(c) an initially partially-hydrated, non-biodegradable, hydrogel rate-limiting membrane, wherein said membrane:

(i) comprises a homopolymer or a copolymer material surrounding said carrier and drug, and

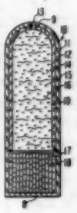
(ii) has an initial water content such that it is substantially non-permeable to said macromolecular drug.

4,959,218

METHOD FOR DELIVERING SOMATOTROPIN TO AN ANIMAL

James B. Eckenhoff, Los Altos; Judy A. Magruder, Mt. View; Richard Cortese, Cupertino; John R. Peery, Palo Alto, and Jeremy C. Wright, Los Altos, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 173,209, Mar. 25, 1988, Pat. No. 4,855,141.
This application Dec. 28, 1988, Ser. No. 291,930
The portion of the term of this patent subsequent to Aug. 8, 2006, has been disclaimed.
Int. Cl.[5] A61M *31/00*
U.S. Cl. 424—473 2 Claims



1. A method for delivering a somatotropin to an animal comprising an aqueous-biological fluid, wherein the method comprises:

(a) admitting into the animal a delivery device comprising:

(1) a wall;

(2) an internal space defined by the wall;

(3) a somatotropin protected from the aqueous-biological fluid in the internal space;

(4) exit means for connecting the exterior and the interior of the device;

(5) means in the space for occupying the space occupied by the somatotropin; and,

(b) delivering the somatotropin by the means occupying space and thereby displacing the somatotropin through the exit means to the animal.

4,959,219

COATING BARRIERS COMPRISING ETHYL CELLULOSE

San-Laung Chow, and Yegnaswami Raghunathan, both of Perinton, N.Y., assignors to Fisons Corporation, Rochester, N.Y.

Filed Aug. 15, 1988, Ser. No. 231,933
Int. Cl.[5] A61K *9/36, 9/62*
U.S. Cl. 424—480 19 Claims

1. An extended-release pharmaceutical composition comprised of individually coated phenylpropanolaminedivinylbenzene sulfonic acid cationic exchange resin particles, the improvement wherein the coating is comprised of (a) ethyl cellulose and (b) from about 1.6% to about 8% by weight corn oil or acetylated monoglycerides with congealing temperatures below about 23° C., based upon the weight of the coated particles.

4,959,220

ANTISEPTIC-CONTAINING ALGINATE IMPRESSION MATERIAL

Tameyuki Yamamoto, Kamakura, and Masao Abiru, Omiya, both of Japan, assignors to G-C Dental Industrial Corporation, Tokyo, Japan

Filed Oct. 12, 1988, Ser. No. 256,566
Claims priority, application Japan, Oct. 12, 1987, 62-254623
Int. Cl.[5] A61K *9/16*
U.S. Cl. 424—490 16 Claims

1. An antiseptic-containing alginate impression material which contains 0.01 to 7 parts by weight of an antiseptic mate-

rial per 100 parts by weight of cured product of dental alginate impression material, wherein said antiseptic material is either encapsulated in a microcapsule or clathrated in a cyclodextrin.

4,959,221

PEST EXTERMINATING COMPOSITION

Iris Holmes, 27 Greenbriar, Princeton Community Village, Princeton, N.J. 08540

Filed Nov. 14, 1988, Ser. No. 270,139
Int. Cl.[5] A01N 59/14
U.S. Cl. 424—659 7 Claims

1. A pest exterminating composition particularly usable for controlling of roaches and mice which comprises:
(a) powdered boric acid of from 1% to 75% by weight;
(b) powdered sugar of from 1% to 75% by weight; and
(c) a dried shredded coconut component of from 1% to 50% by weight, said coconut component being dried to remove oils therefrom.

4,959,222

MAGNESIUM ADDITIVE FOR NUTRIENTS, FEED, AND MEDICAMENTS

Karl J. Nadland, Lier, and Mari A. Kleppe, Tranby, both of Norway, assignors to Collett-Marwell Hauge A/S, Asker, Norway

Filed Sep. 23, 1988, Ser. No. 248,419
Claims priority, application Norway, Sep. 28, 1987, 874067
Int. Cl.[5] A61K 33/08, 33/06, 31/19
U.S. Cl. 424—692 11 Claims

1. An organoleptically acceptable mineral granulate for human consumption in medicaments or as a food additive that consists essentially of a granulating liquid and a mixture of magnesium salts, wherein said mixture contains magnesium lactate and water soluble, acidic, substantially dibasic magnesium citrate, wherein the amount of the magnesium citrate equals from 1 to 40% by weight of the total magnesium in said granulate, the amount of said liquid is sufficient to form said granulate, and the amount of magnesium lactate and dibasic magnesium citrate in said granulate are sufficient to render compositions to which said granulate is added organoleptically acceptable.

4,959,223

RUMINANT ANIMAL FEEDSTUFFS

Johannes A. C. Van Ooyen, Giessenburg, Netherlands, assignor to BP Chemicals Limited, London, England

Filed Apr. 20, 1989, Ser. No. 340,905
Claims priority, application United Kingdom, Apr. 21, 1988, 8809455
Int. Cl.[5] A23K 1/22
U.S. Cl. 426—2 11 Claims

1. A ruminant animal feedstuff comprising a feed concentrate and an amount of a basic salt of propionic acid having a pH of 8–14 effective to improve milk production.

4,959,225

SYNERGISTIC SWEETENING COMPOSITIONS CONTAINING CHLORODEOXYSUGARS AND MALTITOL AND METHODS FOR PREPARING SAME

Lucy L. Wong, Jackson Heights, N.Y.; Steven M. Faust, Stanhope, and Subraman R. Cherukuri, Towaco, both of N.J., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Oct. 28, 1988, Ser. No. 264,248
Int. Cl.[5] A23L 1/236; A23G 3/30
U.S. Cl. 426—3 52 Claims

1. A synergistic sweetening composition having a delayed and enhanced sweetness effect which comprises a chlorodeoxysugar derivative and a bulking agent comprising at least about 50% maltitol.

4,959,226

METHOD OF OPTIMIZING TEXTURE AND PROCESSABILITY OF CHEWING GUMS AND COMPOSITIONS MADE THEREFROM

Albert H. Chapdelaine, Naperville; Vasek J. Kures, Willow Springs, and Ronald T. Grey, Chicago, all of Ill., assignors to Wm. Wrigley Jr. Company, Chicago, Ill.

Continuation-in-part of Ser. No. 25,939, Mar. 16, 1987, Pat. No. 4,803,083. This application Feb. 6, 1989, Ser. No. 307,013
The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.
Int. Cl.[5] A23G 3/30
U.S. Cl. 426—3 19 Claims

1. In a process of developing a new or reformulated chewing gum composition containing gum base, bulking and/or sweetening agents including powdered sorbitol, plasticizers and optional fillers, flavors, colors and processing aids, comprising the steps of
(1) making a sample batch of a gum composition,
(2) evaluating the texture and processability of the sample and
(3) producing and evaluating subsequent sample batches with different amounts of ingredients until acceptable texture and processability characteristics are obtained, the improvement comprising:
(a) using at least two different sorbitol powders in one or more of the sample batches, wherein the sorbitol powders produce statistically significant differences in at least one of the values selected from the group consisting of Taber and Instron hardness when made into gums of the same formula, and
(b) varying the ratio between the at least two sorbitol powders in subsequent sample batches to improve the texture and processability characteristics of the gum formulation.

4,959,227

HIGH DIETARY FIBER LOW LACTOSE LIQUID FOOD AND A METHOD OF PRODUCING SAME

Moh. S. Amer, 3177 Padaro La., Carpenteria, Calif. 93013

Filed Feb. 17, 1987, Ser. No. 15,303
Int. Cl.[5] A23C 9/12
U.S. Cl. 426—35 7 Claims

1. A liquid ready-to-ingest non-fat or low fat food product prepared from a composition comprising, approximately by weight, 71.5 to 89.5% of skim milk, 2 to 10% of non-fat milk solids, 0.5 to 7% of dietary fiber material, no more than 1% of fat, and lactase enzyme within the range of 0.02 to 5% by weight of the lactose in the composition sufficient to hydrolyze at least 75% of such lactose to glucose and galactose.

4,959,228

MEASUREMENT OF SPECIFIC GRAVITY DURING FERMENTATION

Damir M. J. Skrgatic, Edinburgh; James C. Mitchinson, Dunfermline, and John A. Graham, Edinburgh, all of Great Britain, assignors to Acumet Precision Instruments Limited, Edinburg, Scotland

Continuation of Ser. No. 70,849, Jul. 31, 1987, abandoned. This application Nov. 13, 1989, Ser. No. 436,096
Claims priority, application United Kingdom, Oct. 29, 1985, 8526628
Int. Cl.[5] C12C 11/00; G01N 9/00
U.S. Cl. 426—11 6 Claims

1. A method of determining the specific gravity of a fermentable liquor during fermentation having more than two components and consisting of variable proportions of water, alcohol, dissolved fermentable sugars, yeast solids, and carbon dioxide, the method comprising the steps of fermenting the liquor:
establishing a set of data defining the relationship, at a standard temperature, between constant sonic velocities in fermentable liquors of varying original gravities, measur-

ing the original gravity of a given fermentable liquor before fermentation thereof commences.

fermenting said given fermentable liquor,

measuring the velocity of sound in said given fermentable liquor at a given point in time following commencement of fermentation of said given fermentable liquor,

measuring the temperature of said given fermentable liquor at said point in time, and

deriving from said measured velocity and said measured temperature and said set of data the specific gravity of said given fermentable liquor at said given point in time.

4,959,229

CHEESE MANUFACTURE

Malireddy S. Reddy, ADFAC Labs, Inc., 1250 S. Parker Rd., Denver, Colo. 80231; John Mullen, Ty Mawr. Llandyfrydog, Llanerchymedd, Gwynedd, Wales; Clinton J. Washam, 309 Fairway Dr., Columbus, Wis. 53925; C. Gordon Brown, and Charles C. Hunt, both of Bunge Foods Corp., 3582 McCall Pl., N.E., Atlanta, Ga. 30340

Continuation-in-part of Ser. No. 283,208, Dec. 12, 1988, abandoned. This application Mar. 20, 1990, Ser. No. 496,245

Int. Cl.[5] A23C *19/02, 19/076*

U.S. Cl. 426—39 **38 Claims**

1. A method of making cheese comprising:

preconditioning cold, raw milk by lowering the pH to pH 6.0 to 6.6 prior to heat treating;

heat treating the preconditioned milk at about 162° F. to about 190° F.;

cooling the heat treated milk;

post-acidifying the cooled milk to pH 4.9 to 6.0;

inoculating the post-acidified milk with starter culture; and

ripening, treating with a coagulating agent to form a curd; cutting and cooking.

4,959,230

COMPOSITION FOR EXTENDING SHELF LIFE OF FRUITS AND VEGETABLES

Clement R. Wyss, Hillsdale, N.J.; Michael T. McGuire, Elmhurst, and John R. Frost, North Tarrytown, both of N.Y., assignors to Kraft General Foods, Inc., Glenview, Ill.

Filed Sep. 27, 1988, Ser. No. 249,750

Int. Cl.[5] A23B *7/16*

U.S. Cl. 426—102 **22 Claims**

1. A sulfite-free coating composition for reducing deterioration and extending the shelf life of fresh fruits and vegetables comprising an edible, organic acid antidiscoloring agent selected from the group consisting of ascorbic acid, isoascorbic acid, citric acid, fumaric acid, tartaric acid and malic acid, an edible thixotropic gum selected from the group consisting of xanthan gum, guar gum, gum tragacanth, carrageenan gum, alginate gum, and karaya gum, and an edible maltodextrin bulk filler, the weight ratio of the edible gum to the edible acid being from about 1:1 to 30:1, and the weight ratio of the maltodextrin bulk filler to the edible acid being from about 0.1:1 to 10:1.

4,959,231

MICROWAVE FOOD PACKAGING

Robert B. Lakey, Euless, and N. Bruce Graham, Arlington, both of Tex., assignors to Marquee Foods, Incorporated, Arlington, Tex.

Filed Nov. 30, 1988, Ser. No. 278,177

Int. Cl.[5] B65D *21/00*

U.S. Cl. 426—111 **13 Claims**

1. A microwave popcorn package for storing and transporting a serving of corn to be popped and for containing the corn during and after popping, comprising:

(a) a popped corn box having a reclosable top;

(b) a raw corn container of smaller volume than the box located in the bottom of the box, the container having a top opening surrounded by a flange engaging the inner walls of the popped corn box;

(c) a serving of popping corn in the container and

(d) a flexible film sealing the top of the raw corn container by adhering to the container flange surrounding the top opening, a portion of the film seal being releasable from the flange upon heating of the corn.

4,959,232

PROCESS FOR MAKING LIQUID SMOKE COMPOSITIONS AND RESIN TREATED LIQUID SMOKE COMPOSITIONS

Gary Underwood, Manitowoc, Wis., assignor to Red Arrow Products Company, Inc., Manitowoc, Wis.

Filed Apr. 26, 1989, Ser. No. 343,928

Int. Cl.[5] A23L *1/221*

U.S. Cl. 426—271 **19 Claims**

1. A process for making a high browning, reduced flavor liquid smoke composition comprising the step of:

contacting an aqueous liquid smoke solution of about 4 to 40 brix with both a polymeric nonionic resin and a polymeric ion resin to produce a composition having reduced phenol and basic constituents, a browning index from about 8 to about 12, and a phenol content of about 2 to about 12 mg/ml.

4,959,233

EMULSIFIER AND A METHOD FOR ITS PREPARATION

Herbert W. D. Schou, deceased, late of Juelsminde (by Gudrun Schou, heiress), and Jack A. Dreyer, Horsens, both of Denmark, assignors to NEXUS ApS, Juelsminde, Denmark

PCT No. PCT/DK86/00059, § 371 Date Jan. 23, 1987, § 102(e) Date Jan. 23, 1987, PCT Pub. No. WO86/06937, PCT Pub. Date Dec. 4, 1986

PCT Filed May 29, 1986, Ser. No. 19,245

Claims priority, application Denmark, May 31, 1985, 2446/85

The portion of the term of this patent subsequent to May 31, 2005, has been disclaimed.

Int. Cl.[5] A23L *1/035;* **A23P** *1/12*

U.S. Cl. 426—443 **4 Claims**

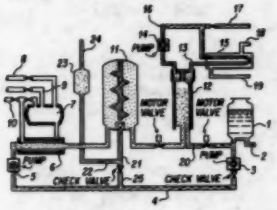
1. A method for preparing a free-flowing emulsifier product containing a polyglycerol partial fatty acid ester emulsifier comprising polyglycerol which is monesterified or diesterified with saturated fatty acid moieties, in which the fatty acid moieties are selected so that the average number of carbon atoms in the acid moieties is in the range between 13.0 and 16.5, which method comprises mixing the emulsifier with a particulate carrier and subjecting the resulting mixture to extrusion.

4,959,234

METHOD FOR IMPROVING THE TASTE, TEXTURE AND MOUTH FEEL OF A LIQUID DAIRY PRODUCT AND FOR CONCENTRATING SAME

Salah H. Ahmed, Elk Grove Village, and Anthony J. Lukaas, Downers Grove, both of Ill., assignors to Electric Power Research Institute, Palo Alto, Calif.

Filed Nov. 17, 1988, Ser. No. 272,282
Int. Cl.[5] A23C 1/06, 19/05
U.S. Cl. 426—580 37 Claims



1. A method for improving the taste, texture and mouth feel of a liquid dairy product and for concentrating the liquid dairy product, comprising:

(1) disposing the liquid dairy product in a scraped surface heat exchanger and cooling the liquid dairy product therein to a temperature at or below its freezing point to provide a cooled liquid dairy product;

(2) passing the cooled liquid dairy product to a recrystallizer and crystallizing ice crystals from said cooled liquid dairy product to produce a mixture of concentrated product and ice crystals;

(3) passing the concentrated product and ice crystals to a vertically disposed, vertically elongated ice scrapper wherein the ice crystals are mechanically worked and separating a portion of said ice crystals from the upper part of the ice scrapper and from said mixture in said ice scrapper and heating the separated ice crystals to form a melt thereof;

(4) passing the melt into the ice scrapper near the upper part thereof and washing the said mixture in said ice scrapper with the said melt to form a washed mixture of the concentrated product and the ice crystals in the said ice scrapper;

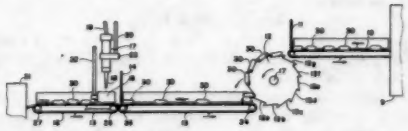
(5) separating the remaining ice crystals from the washed mixture and recovering the concentrated product; and wherein the amount of ice crystals formed in the crystallizing step is sufficient that the recovered product has a solids content of at least about 20.

4,959,235

FILLED CRACKER MAKING PROCESS

Agostino Aquino, Paterson, N.J., and Karl U. Lang, Port Jarvis, N.Y., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Sep. 6, 1988, Ser. No. 240,198
Int. Cl.[5] A21D 8/06
U.S. Cl. 426—281 9 Claims



1. A method producing filled hard biscuit products comprising

(a) baking a plurality of pieces of a dough adapted to expand during baking to yield a plurality of baking forms having an essentially hollow center;

(b) conveying said plurality of baked forms to a device to invert said baked forms;

(c) aligning said plurality of baked forms into lines and conveying said baked forms in a plurality of channels to an indexing mold;

(d) simultaneously inverting each line of said baked forms;

(e) piercing an upper portion of each of said inverted baked forms with a needle to fill said inverted baked forms with a filling, and

(f) filling each of said inverted baked forms.

4,959,236

PROCESS FOR REMOVING PELLICLE FROM NUT MEATS

Robert E. Gunnerson, Manteca, and Richard C. Bruno, Lodi, both of Calif., assignors to Sun-Diamond Growers of California, Stockton, Calif.

Filed Jul. 11, 1989, Ser. No. 378,346
Int. Cl.[5] A23L 1/00
U.S. Cl. 426—288 16 Claims

1. A process for removing pellicle from nut kernels which comprises:

(a) immersing said nut kernels in a composition comprising a mixture of a vegetable oil and a wetting agent in water at ambient temperature, to soften and loosen said pellicle;

(b) removing said nut kernels from said composition and draining said nut kernels;

(c) exposing said nut kernels to a force of ambient temperature water, to remove said pellicle; and

(d) separating said nut kernels from said pellicle.

4,959,237

REVERSE OSMOSIS CONCENTRATION OF JUICE PRODUCTS WITH IMPROVED FLAVOR

James B. Walker, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jun. 7, 1989, Ser. No. 362,719
Int. Cl.[5] A23L 2/04
U.S. Cl. 426—330.5 15 Claims

1. A membrane process for preparing a concentrated superior-tasting food juice comprising the steps of:

(a) feeding a clarified serum to a multistage reverse osmosis (RO) system, wherein the serum is fed at a trans-membrane pressure of 1000 psig or greater to the first stage of the system which comprises one or more RO units having high-rejection polyamide membranes in which the retentate of one unit is fed to the subsequent unit if there are more than one; and

(b) feeding the retentate from the last of the high-rejection RO units at a trans-membrane pressure of 1000 psig or greater to the second stage which comprises one or more RO units having low-rejection membranes, wherein the retentate of each low-rejection RO unit is fed to the subsequent unit if there are more than one and wherein all permeates from the second stage are ultimately recycled to the first stage.

4,959,238

PROCESS FOR THE PRODUCTION OF TEXTURIZED ANIMAL PROTEIN

Simon R. Hall, Melton Mowbray, and Garry D. Wills, Denton, both of England, assignors to Mars GB Ltd., England

Filed Sep. 26, 1988, Ser. No. 249,590
Claims priority, application United Kingdom, Sep. 29, 1987, 8722836
Int. Cl.[5] A23J 3/26; A23L 1/31
U.S. Cl. 426—447 8 Claims

1. A process for the production of textured animal protein product comprising reducing the amount of gelatin, hydrolysable collagen or both in animal meal, forming a heated pressu-

rised wet mass of the animal meal, and reducing the pressure and temperature surrounding the mass so that the textured animal protein product has a measurable gelatin content of less than 10% of the dry solids of the product.

4,959,239

PROCESS FOR PREPARING AN EDIBLE DISPERSION

Peter B. Ernsting, Delft; Jan Van Heteren, and Tjaard R. J. Niemeyer, both of Vlaardingen, all of Netherlands, assignors to Lever Brothers Company, New York, N.Y.

Filed Nov. 2, 1988, Ser. No. 266,046

Claims priority, application United Kingdom, Nov. 4, 1987, 8725803

Int. Cl.[5] A23D *3/02*

U.S. Cl. 426—603 **4 Claims**

1. A process for preparing an edible plastified dispersion comprising from 40–80 wt% of a continuous fat phase and from 60–20 wt% of a dispersed aqueous phase, which process comprises the steps of:

(a) churning cream to obtain butter and buttermilk,

(b) working the buttermilk obtained in step (a) with a non-dairy fat to obtain a water-in-oil emulsion, and

(c) mixing the emulsion obtained in step (b) with butter obtained in step (a) under working conditions of sufficiently low shear that the granular structure of the butter is preserved.

4,959,240

POTATO-BASED FOODSTUFF

David J. Aulik, Channel Islands Harbor, and Robert E. Christensen, Camarillo, both of Calif., assignors to Horizons International Foods, Inc., Burlington, Mass.

Continuation-in-part of Ser. No. 17,140, Feb. 20, 1987, abandoned. This application Oct. 14, 1987, Ser. No. 108,722

Int. Cl.[5] A23L *1/216, 1/217*

U.S. Cl. 426—637 **15 Claims**

1. A foodstuff comprising:

(a) between about 10 and about 45 percent of a fibrous non-potato vegetable protein having aligned bundles of fibers;

(b) between about 6 and about 90 percent of a nonfibrous potato material.

4,959,241

SURFACING METHOD

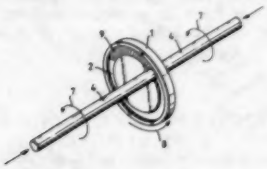
Wayne M. Thomas, and Edward D. Nicholas, both of Suffolk, England, assignors to The Welding Institute, Cambridge, England

Filed Apr. 10, 1989, Ser. No. 335,820

Claims priority, application United Kingdom, Apr. 11, 1988, 8808479

Int. Cl.[5] B05D *1/40*

U.S. Cl. 427—11 **34 Claims**



1. A method of providing a material surface on a substrate, the method comprising applying a consumable member to said substrate under pressure; moving said member and substrate relative to one another along a path and generating heat at the interface between said member and said substrate so that material is laid down on said substrate along said path, wherein said member comprises an outer body of a first material which contains an insert of a second material different from said first material which is laid down onto said substrate.

4,959,242

METHOD FOR FORMING A THIN FILM

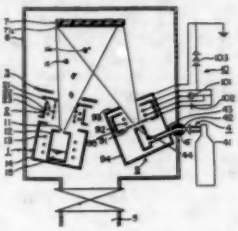
Hiroki Itoh, Amagasaki, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Japan

Division of Ser. No. 113,165, Oct. 27, 1987, Pat. No. 4,805,555. This application Aug. 30, 1988, Ser. No. 238,114

Claims priority, application Japan, Oct. 29, 1986, 61-255848; Mar. 13, 1987, 62-56686; May 8, 1987, 62-110613

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—38 **12 Claims**



1. A method for forming a thin film comprising:

generating a beam of electrons by heating a filament to emit electrons and electrostatically attracting the electrons toward a charged electrode to form the beam of electrons;

activating reactive gases by irradiating said reactive gases in a relatively low vacuum with the electron beam as said reactive gases are directed toward a substrate disposed in a relatively high vacuum;

forming vapors including atomic clusters and non-clustered atomic particles of a material that is to be deposited on said substrate;

partially ionizing said clusters and said non-clustered atomic particles to form cluster ions and non-clustered ions, respectively;

simultaneously with directing said activated reactive gases toward said substrate, directing said cluster ions, said non-clustered ions, and non-ionized clusters and non-clustered atomic particles toward said substrate which is surrounded with said activated reactive gases; and

reacting said cluster ions, said non-clustered ions, and said non-ionized clusters and non-clustered atomic particles with said activated reactive gases to deposit a thin film on said substrate.

4,959,243

PRODUCTION OF A SHEET-LIKE, MULTILAYER MAGNETO-OPTICAL RECORDING MATERIAL

Helmut Steininger, Worms, Fed. Rep. of Germany, and , assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Jan. 24, 1989, Ser. No. 300,849

Claims priority, application Fed. Rep. of Germany, Feb. 2, 1988, 3803013

Int. Cl.[5] H01F *10/02*

U.S. Cl. 427—48 **3 Claims**

1. A process for the production of a magneto-optical recording element comprising

(A) an optically transparent dimensionally stable substrate,

(B) a thermally alterable recording layer consisting of an amorphous lanthanide/transition metal alloy, and

(C) a film consisting essentially of multiple separate carbide, nitride and/or oxide layers, at least on that side of the recording layer (B) which faces away from the substrate (A),

the said lanthanide/transition metal alloy being applied via the gas phase to the surface of the said substrate (A) or to the surface of a film (C) already present on the substrate (A) or of another film already present, resulting in the said recording layer (B), which process comprises:

(I) applying a 30–500 nm thick film (C_1) to surface of the recording layer (B) or to the surface of a further layer already present on the recording layer (B), said film (C_1) having the following specifications:

(C_{11}) the film (C_1) consists of two or more components;

(C_{12}) the said components are contained in three or more separate element and element carbide, nitride and oxide layers, each consisting of one or more of these components;

(C_{13}) the components of the element layer or layers are selected from the group consisting of the elements boron, aluminum, gallium, indium, silicon, germanium, tin, lead, antimony, bismuth, magnesium, titanium, zirconium, hafnium, vanadium, niobium, tantalum, chromium, molybdenum, tungsten, iron, cobalt, zinc, cadmium, lanthanum, cerium, praseodymium, neodymium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, lutetium and thorium;

(C_{14}) the components of the element carbide, nitride and oxide layer or layers are selected from the group consisting of the carbides, nitrides and oxides of the said elements (C_{13});

(C_{15}) directly adjacent layers consisting of the said carbides, nitrides and/or oxides (C_{14}) differ in composition from one another;

(C_{16}) two or more of the layers consisting of the said carbides, nitrides and/or oxides (C_{14}) are separated from one another by one or more 0.1–30 nm thick layers consisting of one or more of the elements (C_{13}); and

(C_{17}) that layer which is directly adjacent to the said recording layer (B) or which faces it always consists of the said carbides, nitrides and/or oxides (C_{14});

said film (C_1) being applied by carrying out the following two process steps (11) and (12) several times:

(11) application of one or more layers consisting of one or more of the said carbides, nitrides and oxides (C_{14}) of the said elements (C_{13}) via the gas phase, resulting in one or more separate layers (C_{14}), and

(12) application of one or more 0.1–30 nm thick layers consisting of one or more of the elements (C_{13}), resulting in one or more element layers (C_{13}), followed by

(II) reacting the said element layer or layers layers (C_{13}) of the said film (C_1) with a reactant selected from the group consisting of oxygen, nitrogen and carbon, and

thereafter induction of a defined magnetization, oriented at right angles to the surface, in the said recording layer (B).

4,959,244

TEMPERATURE MEASUREMENT AND CONTROL FOR PHOTOHERMAL PROCESSES

Carl M. Penney, Saratoga Springs, N.Y., and Tushar S. Chande, Pittsburgh, Pa., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 27, 1989, Ser. No. 329,054

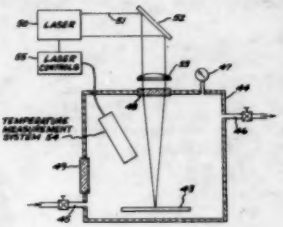
Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—53.1 **2 Claims**

1. A method of controlling a radiation assisted chemical vapor deposition process comprising:

delivering radiation to a portion of the surface of a workpiece to cause deposition of gaseous chemical reactants onto the workpiece by radiation heating;

sensing the workpiece surface temperature resulting from said radiation by detecting thermal emission from said workpiece toward the short wavelength edge of the thermal emission spectrum and deriving therefrom a surface temperature signal; and



utilizing the sensed surface temperature to control said radiation and deposition process.

4,959,245

METHOD OF MODIFYING A SURFACE OF A BODY USING ELECTROMAGNETIC RADIATION

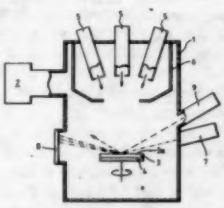
Peter J. Dobson, South Croydon, and James H. Neave, Horsham, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 16, 1988, Ser. No. 245,861

Claims priority, application United Kingdom, Oct. 16, 1987, 8724318

Int. Cl.[5] B05D *3/06*

U.S. Cl. 427—53.1 **26 Claims**



1. A method of modifying a surface of a body comprising the steps of

(a) providing a body having a surface,

(b) supplying gaseous material onto said surface to form at least one layer of said material on said surface, and

(c) treating said at least one layer by directing a beam of electromagnetic radiation to said layer within ±5° of Brewsters angle for said at least one layer to grow at least one smoothed epitaxial layer of said material on said surface.

4,959,246

SCREEN PRINTING PROCESS AND APPARATUS AND ELECTRICAL PRINTED CIRCUITS OBTAINED THEREWITH

Camiel D. Cleemput, Wondelgem - Gent, Belgium, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Jun. 6, 1984, Ser. No. 617,853

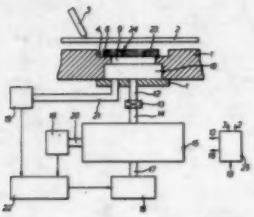
Claims priority, application Belgium, Jun. 6, 1983, 2/60122

Int. Cl.[5] C23C *26/00*

U.S. Cl. 427—97 **3 Claims**

1. Screen printing process which comprises the steps of: applying an electrically conductive paste through a screen and by means of a movable squeege to a surface of a substrate provided with at least one hole extending between said surface and another surface of said substrate; and exerting an under-

pressure on said another surface so as to coat at least part of the inner wall of said hole with said paste; characterized in that said underpressure is substantially constant and equal to a first value between limits of 10 gr/cm^2 and 200 gr/cm^2, in that said



underpressure is obtained from a vacuum vat, and in that said underpressure is realized in a vacuum chamber located next to said substrate and communicating with said vacuum vat, said vacuum vat having a volume which is relatively large with respect to that of said vacuum chamber.

4,959,247

ELECTROCHROMIC COATING AND METHOD FOR MAKING SAME

Frank H. Moser, and Niall R. Lynam, both of Holland, Mich., assignors to Donnelly Corporation, Holland, Mich.

Filed Dec. 14, 1987, Ser. No. 132,196
Int. Cl.[5] B05D *5/12, 5/06*
U.S. Cl. 427—126.5 **42 Claims**

1. A method for preparing an electrochromic coating on a substrate, consisting essentially of:

forming a coating solution by contacting at least one transition metal nitrate compound with at least one monohydric alcohol having from 1 to 5 carbon atoms;

coating the surface of said substrate with said coating solution to provide a coating thereon of a desired thickness; and

firing said coating to an electrochromically active state.

4,959,248

PROCESS FOR IMPARTING STAIN RESISTANCE TO FIBERS AND TO ANTI-STAINING AGENTS FOR USE IN THE PROCESS

Bryce C. Oxenrider, Florham Park, and Frederick R. Hopf, Parsippany, both of N.J., assignors to Allied-Signal, Morris Township, Morris County, N.J.

Filed Nov. 20, 1987, Ser. No. 123,406
Int. Cl.[5] D02G *3/00*
U.S. Cl. 427—385.5 **37 Claims**

1. A process for imparting stain resisting properties to fibers formed from thermoplastic polymers, said process comprising:

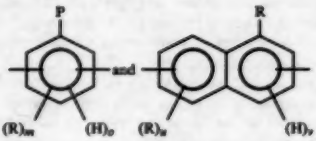
(a) treating said fibers with a composition comprising an effective carrier and a stain resisting effective amount of one or more condensation products of the Formula I:

P—Z—X—Z—X—Z—P; Formula I

and

(b) annealing said treated fiber; wherein:

Z is a divalent moiety of the formulas:



wherein:

P is a hydrogen, —OH or a moiety of the formula —X—OH;

m and o are the same or different and are positive whole numbers from 0 to 3 with the proviso that the sum of o and m at each occurrence is equal to 3;

u and v are the same or different at each occurrence and are positive whole numbers from 0 to 5 with the proviso that the sum of u and v at each occurrence is 5;

—X— is a divalent organic radical;

R is the same or different at each occurrence and is selected from the group consisting of alkyl, aryloxy, alkoxy, aryl, hydroxy, and methylol; and

n is a positive whole number.

4,959,249

SELF-CROSSLINKING VINYL ESTER DISPERSIONS HAVING A REDUCED FORMALDEHYDE CONTENT OR CONTAINING NO FORMALDEHYDE FOR STRENGTHENING TEXTILE FIBER STRUCTURES

Bernd Schilling, Schopenhauerweg 10; Gerhard Brink, Inden Gruben Nr. 131/32, both of 8263 Burghausen; Ingo Harder, Kollmunzerstrasse 21a, 8261 Mehring/Od, and Hubert Wiest, Wettersteinstrasse 26, 8023 Pullach, all of Fed. Rep. of Germany

Division of Ser. No. 221,729, Jul. 20, 1988, abandoned. This application Oct. 18, 1989, Ser. No. 423,002
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727181
Int. Cl.[5] C08F *218/08, 130/08;* C08G *77/20;* C09D *143/04*
U.S. Cl. 427—387 **4 Claims**

1. A process for strengthening a textile fiber structure which comprises:

(1) applying to said textile fiber structure from about 20–40 % of a self-crosslinking vinyl ester copolymer aqueous dispersion, based on the weight of copolymer and textile fiber structure, said dispersion having a reduced formaldehyde content or containing no formaldehyde for strengthening textile fiber structures, and comprised of:

(a) 40–99% by weight of vinyl esters of branched or linear carboxylic acids having 1 to 12 carbon atoms,

(b) 1–6% by weight of vinyltrialkoxysilanes and/or alkylvinyldialkoxysilanes containing branched or linear alkyl or alkoxy radicals having 1 to 4 carbon atoms,

(c) 0–40% by weight of ethylene,

(d) 0–10% by weight of ethylenically unsaturated, hydroxyalkyl-functional compounds,

(e) 0–10% by weight of ethylenically unsaturated carboxylic acids,

(f) 0–5% by weight of amides, N-alkylamides and/or N-alkoxyalkylamides of ethylenically unsaturated carboxylic acis, and

(g) 0–1% by weight of ethylenically polyunsaturated compounds, and

(2) crosslinking the copolymer under conditions suitable for film formation.

3. The process of claim 1, wherein the copolymer is crosslinked by heating to a temperature of from about 50 to about 150° C.

4,959,250
SIMULATED MARBLE

Gordon McKinnon, 119 S. Oregon Ave., Tampa, Fla. 33606

Continuation-in-part of Ser. No. 861,233, May 7, 1986, Pat. No. 4,721,634. This application Nov. 19, 1987, Ser. No. 122,398
The portion of the term of this patent subsequent to Jan. 26, 2005, has been disclaimed.
Int. Cl.[5] B44F 9/04; B05D 3/12, 5/00; B32B 3/10
U.S. Cl. 428—15 19 Claims

1. A process for covering a substrate with a simulated marble surface comprising:

mixing cement and sand to form a first mixture;

adding an aqueous solution of an adhesive resin to the first mixture to create a first liquid mortar;

mixing cement and sand to form a second mixture;

adding an aqueous solution of an adhesive resin to the second mixture to create a second liquid mortar;

adding and mixing a contrasting pigment to each one of the first and second mortars such that color of the first mortar contrasts with the color of the second mortar;

applying the first liquid mortar onto the substrate to form a first textured coat on the substrate;

applying the second liquid mortar onto randomly spaced portions of the first coating prior to the complete curing of the first coating enabling the first and second coatings to form a unitary textured covering for the substrate with the contrasting pigment being randomly spaced in the textured unitary covering with the textured unitary coating having a lower layer and an upper layer with the lower layer comprising the first and second liquid mortar and the upper layer comprising the second liquid mortar;

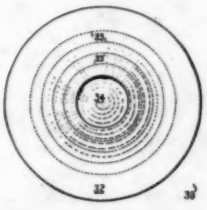
allowing the contrasting pigment in each of the first and second liquid mortars to commingle with the other of the first and second liquid mortars to enable the contrasting pigmented areas of the first mortar to blend with the contrasting pigmented areas of the second mortar; and

troweling substantially only the blended upper layer of the unitary textured covering on the substrate to simulate a marble surface.

4,959,251
ELASTIC PATCH FOR HOLES IN WALLS

R. Larry Owens, 5121 E. Shore Dr., Conyers, Ga. 30208, and Paul G. McClellan, 1795 Mackinaw Pl., Smyrna, Ga. 30080

Continuation-in-part of Ser. No. 95,433, Sep. 11, 1987, abandoned. This application Oct. 26, 1988, Ser. No. 262,703
Int. Cl.[5] B32B 7/06, 7/12, 3/02
U.S. Cl. 428—41 5 Claims



1. A patch for a hole in a wall comprising:

(a) a generally flat elastic body portion having its greatest thickness in the mid-section thereof, the body portion tapering to its minimum thickness at least one edge of the body portion;

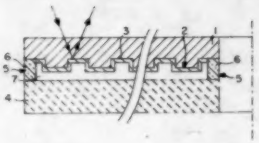
(b) a pressure sensitive adhesive layer attached to said body portion;

(c) a protective cover, attached to the exposed surface of said adhesive layer, which is perforated delineating sections of the cover so that a region of the adhesive layer can be uncovered which is larger than the hole.

4,959,252
HIGHLY ORIENTED THERMOTROPIC OPTICAL DISC MEMBER

Claude Bonnebat, Pontault-Combault; Jean-Pierre Quentin, Lyon, and Alain Morin, Villeurbanne, all of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France

Continuation-in-part of Ser. No. 102,475, Sep. 29, 1990, abandoned. This application Oct. 10, 1989, Ser. No. 418,966
Claims priority, application France, Sep. 29, 1986, 86 13715
Int. Cl.[5] G11B 23/00
U.S. Cl. 428—64 14 Claims



1. A dimensionally stable, circular, rigid and planar substrate, adapted for use as a support substrate for a radiation sensitive layer for an optical disc, said substrate having an external diameter of from 60 mm to 360 mm, a thickness of from 0.5 mm to 4 mm, a relative density of less than 1.8, a modulus of elasticity in the radial direction of from 9000 MPa to 18000 MPa, a coefficient of heat expansion in the radial injection which is less than 30 m/m/°C., a deformation temperature under load of at least 150° C., and, on part or all of at least one of its faces, an etching made at the time of the injection molding operation consisting of a groove in the form of a spiral or of concentric tracks, with a pitch of between 0.4 and 1 μm; said substrate being formed by injection molding a thermotropic aromatic polyester polymer having a flow temperature ranging from 200° to 350° C. and an inherent viscosity of at least 1 dl/g in a mold fitted with a central injection system under the following conditions: (1) temperature of the molten polymer of from 280° to 350° C.; (2) injection pressure of from 80 MPa to 160 MPa; (3) a temperature of the mold walls which ranges from 100° to 200° C.; (4) an injection time which ranges from 2 to 10 seconds and (5) a holding pressure after injection which ranges from 40 MPa to 120 MPa, whereby said substrate is substantially perfectly smooth on the non-etched parts of its faces as reflected in a surface roughness of less than 0.05 m and is substantially perfectly planar as reflected in a warp angle of less than 1×10^{-5} radian.

4,959,253
BACKING MATERIAL FOR CARPET UNDERLAY

William H. Tough, Tayport, Scotland, assignor to Scott & Fyfe Limited, Fife, Scotland

Division of Ser. No. 272,433, Nov. 17, 1988. This application Aug. 31, 1989, Ser. No. 400,347
Claims priority, application United Kingdom, Nov. 24, 1987, 87.27449
Int. Cl.[5] B32B 3/28
U.S. Cl. 428—102 7 Claims

1. A backing material for a carpet underlay which comprises a sheet of crepe paper, parallel rows of stitches formed in the

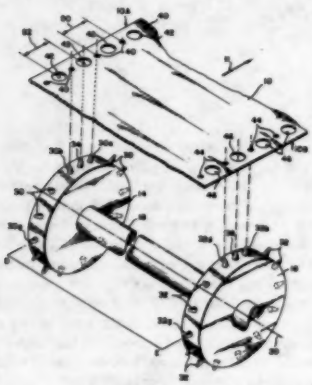
crepe paper sheet such that the stitches substantially restrict the extensibility of the crepe paper sheet, and rows of projections embossed in the crepe paper sheet between the rows of stitches without puncturing the paper sheet.

4,959,254

WEB WITH AUXILIARY HOLES

Joseph W. Coburn, Jr., 953 Princewood Ave., Lakewood, N.J. 08701

Filed Dec. 6, 1989, Ser. No. 446,860
Int. Cl.[5] B32B *3/10*
U.S. Cl. 428—131 **2 Claims**



1. A web for feeding on a pair of feed sprockets rotatable about a common axis and each sprocket provided with a plurality of radially outwardly extending standard feed pins uniformly spaced from each other circumferentially of said sprocket, each standard feed pin on each sprocket associated with a standard feed pin on the other sprocket and associated standard feed pins lying in substantially the same plane containing said common axis, at least one of said sprockets provided with at least one radially outwardly extending additional pin positioned intermediate an adjacent pair of said standard feed pins, said additional pin having a predetermined circumferential location between said adjacent pair of standard feed pins and having a predetermined circumferential location on said one sprocket, comprising:

a longitudinally extending web provided with two longitudinally extending side edge portions each provided with a plurality of standard feed holes uniformly spaced from each other and for receiving said standard feed pins to feed said web longitudinally upon rotation of said sprockets; and

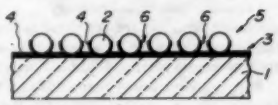
each of said side edge portions also provided with a plurality of auxiliary holes larger than said standard feed holes, one of said auxiliary holes located intermediate each pair of adjacent standard feed holes on each of said side edge portions to permit said auxiliary holes to receive said additional pin during feeding of said web regardless of the circumferential location of said additional pin on said one sprocket, and said auxiliary holes sufficiently large to receive said additional pin during feeding of said web regardless of the circumferential location of said additional pin between said pair of adjacent standard feed pins.

4,959,255

CERAMIC SUBSTRATES AND METHOD OF MANUFACTURING THE SAME

Go Suzuki, Nagoya, Japan, assignor to NGK Insulators, Ltd., Japan

PCT No. PCT/JP88/00383, § 371 Date Aug. 31, 1988, § 102(e) Date Aug. 31, 1988, PCT Pub. No. WO88/07983, PCT Pub. Date Oct. 20, 1988
PCT Filed Apr. 16, 1988, Ser. No. 251,700
Claims priority, application Japan, Apr. 16, 1987, 62-92060
Int. Cl.[5] B32B *3/10*
U.S. Cl. 428—143 **5 Claims**



1. A ceramic substrate provided with an electrolessly plated layer on a surface thereof, comprising:

a dense ceramic body; and

a plurality of granular protruding portions formed on a surface of said dense ceramic body thereby defining a plurality of spaces between said granular protruding portions, said spaces having necked portions at points adjacent mid-sections of said granular protruding portions and base portions at points adjacent said dense ceramic body;

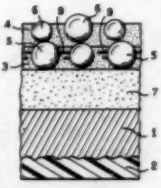
wherein said base portions of said spaces are substantially wider than said necked portions thereof, such that said granular protruding portions provide anchoring means for said electrolessly plated layer, and said necked portions each have a length which is less than twice a thickness of said electrolessly plated layer.

4,959,256

ENAMEL COATING CHARGED WITH GLASS BEADS FOR THE BOTTOM OF COOKING UTENSILS AND UTENSILS COATED IN THIS MANNER

Henri Piera, Annecy, France, assignor to SEB S.A., Selongey, France

Filed Dec. 27, 1988, Ser. No. 291,452
Claims priority, application France, Dec. 30, 1987, 87 18380; Dec. 30, 1987, 87 18381; Dec. 30, 1987, 87 18382
Int. Cl.[5] B32B *19/04, 17/06*
U.S. Cl. 428—144 **10 Claims**



1. A cooking utensil having a bottom (1) entirely covered by a first enamel layer (7) which supports a second continuous enamel layer which in turn supports a second continuous enamel layer (3) which supports a non-continuous third enamel layer (4) constituting a raised surface decoration and applied by screen process after drying of the first layer, these three

layers (7, 3, 4) being obtained from an enamel frit and being fired simultaneously, wherein the second and third enamel layers (3, 4) contain glass beads (5, 6), at least a certain number of which have a diameter of greater value than the thickness of said enamel layers and project from the surface of said layers, a certain number of beads (6) of the non-continuous third layer (4) being applied on beads (5) of the second layer (3) and wherein the second enamel layer (3) contains mica flakes (9) which are covered with a member selected from the group consisting of TiO_2, Fe_2O_3 and a mixture thereof and which are oriented in a direction parallel to each other and to the surface of said layer and partly overlap each other, said third layer being free from said flakes.

4,959,257

TRANSPARENCIES

Arabinda Mukherjee, Edgeware, England, assignor to Lucas Industries public limited company, Birmingham, England

Filed Jul. 12, 1988, Ser. No. 217,934

Claims priority, application United Kingdom, Jul. 17, 1987, 8716854

Int. Cl.[5] B32B *3/26, 15/04*

U.S. Cl. 428—156 **10 Claims**

1. A transparency comprising a transparent substrate having an electrically conductive de-misting and/or de-icing metal film thereon and electrical supply contacts connected to said metal film for conducting electricity therethrough, with the optional inclusion of a transparent resin layer between said substrate and said electrically conductive metal layer; and a sputtered layer containing an oxide of indium is provided on said electrically conducting metal film, wherein the thickness of said metal film varies over the surface of the transparency so that the power dissipation of said metal film is uniform over the area of the substrate.

4,959,258

JOINED METAL-CERAMIC ASSEMBLY METHOD OF PREPARING THE SAME

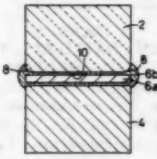
Akihiko Yoshida, Iwakura, and Naohito Yamada, Nagoya, both of Japan, assignors to NGK Insulators, Ltd., Japan

Filed Dec. 22, 1988, Ser. No. 288,423

Claims priority, application Japan, Dec. 28, 1987, 62-335246

Int. Cl.[5] B32B *15/04*

U.S. Cl. 428—192 **10 Claims**



1. A joined metal-ceramic assembly, comprising:
a ceramic member;
a metallic member; and
an intermediate layer interposed between said ceramic member and said metallic member for abuttingly joining said ceramic member and said metallic member, said intermediate layer consisting of:
(i) a metallic intermediate portion;
(ii) a first brazing metal layer formed on a surface of said metallic intermediate portion; and
(iii) a second brazing metal layer formed on an opposite surface of said metallic intermediate portion;
wherein a joining surface of said ceramic member, at which said ceramic member is joined with said intermediate layer, includes a rounded peripheral portion having a substantially arcuate cross-sectional shape and at least half of said rounded peripheral portion is bonded to said first brazing metal layer.

4,959,259

METHOD FOR THE PROTECTION AGAINST WATER OF A LAMINATED RESIN WALL, AND A PROTECTED LAMINATED RESIN WALL THUS OBTAINED

Vincent Guilband, Chauve, France, assignor to Chantiers Beneteau S.A., Saint Hilaire De Riez, France

Filed Oct. 18, 1988, Ser. No. 259,147

Claims priority, application France, Aug. 24, 1988, 88 11180

Int. Cl.[5] B32B *7/02, 27/08*

U.S. Cl. 428—215 **13 Claims**

6. A structure for prolonged contact with water, comprising a laminated resin wall formed from a substrate whose outer surface is placed in contact with water, said outer surface having coated thereon a barrier layer of polymerized resin consisting essentially of at least one member selected from the group consisting of bisphenolic polyesters and unsaturated isophthalic polyesters, said layer having a thickness of 0.30 to 0.45 mm, and a gel coat resin layer coating said barrier resin layer, said gel coat resin layer having a thickness of 0.30 to 0.45 mm and a lower steric space requirement than said barrier resin.

4,959,260

MESH FABRIC FOR PRINTING SCREEN

Haruo Tomoyasu; Chobe Tango, both of Katsuyama; Takuo Omote, and Yoshinori Kato, both of Fukui, all of Japan, assignors to Nihon Tokushu Orimono Co., Ltd., Fukui and Kanebo Ltd., Tokyo, both of, Japan

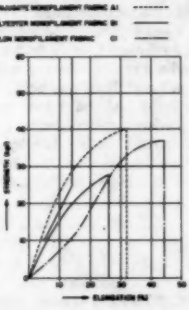
PCT No. PCT/JP87/00601, § 371 Date Dec. 19, 1988, § 102(e) Date Dec. 19, 1988, PCT Pub. No. WO88/06103, PCT Pub. Date Aug. 25, 1988

PCT Filed Aug. 10, 1987, Ser. No. 269,186

Claims priority, application Japan, Feb. 17, 1987, 62-35252

Int. Cl.[5] B32B *7/00*

U.S. Cl. 428—255 **11 Claims**



1. A mesh fabric useful for a printing screen consisting essentially of conjugate filaments, each of said conjugate filaments being composed of a sheath and a core, said sheath being formed of a material having high adhesive property to an emulsion and a resin used for making the screen, said core being formed of a material having high dimensional stability and elastic recovery property, said mesh fabric having a breaking elongation of from 15 to 40 % and a breaking strength of not less than 25 kgf, and having a correlation between the strength Y (kgf) and the elongation X (%) in the elongation range of not less than 5%, in the stress-strain curve of the mesh fabric by the labelled strip method at the specimen width of 5 cm and the grip interval of 20 cm satisfying the following formula:

$$Y \geq (X+1) \times 5/3.$$

4,959,261

FLUORINATED NON-GRAPHITIC CARBONACEOUS FILMS AND FOAMS

Francis P. McCullough, Jr., and Leo R. Novak, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 21, 1989, Ser. No. 383,837
Int. Cl.[5] B32B 3/26, 9/00
U.S. Cl. 428—312.2 12 Claims

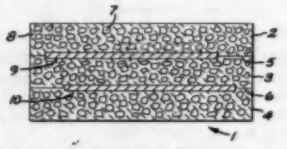
1. A film or foam structure comprising a non-flammable nongraphitic carbonaceous film or foam having an LOI greater than 40 and at least a partially fluorinated surface.

4,959,262

ZINC OXIDE VARISTOR STRUCTURE

Richard J. Charles, Schenectady, and Achuta R. Gaddipati, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 31, 1988, Ser. No. 238,791
Int. Cl.[5] B32B 7/00
U.S. Cl. 428—329 18 Claims



1. A composite *useful for forming a varistor device* comprised of a multi-layer varistor matrix containing a plurality of continuous metallizations comprised of at least a first and second metallization, said varistor matrix being comprised of at least three layers with a portion of each matrix layer being directly bonded to another matrix, layer, said matrix totally surrounding and being directly bonded to each metallization, said metallizations being separated from each other by at least substantially a layer of matrix, each said metallization being present at substantially a region between two layers of matrix, said first and second metallizations being offset from each other, at least one of said first and second metallizations being overlapping, said varistor matrix being comprised of zinc oxide grains isolated from each other by continuous *amorphous* glassy phase, said metallizations being comprised of elemental silver, said composite having a porosity of less than about 10%.

4,959,263

MAGNETIC RECORDING MEDIUM

Masashi Aonuma; Tsutomu Okita; Hiroshi Hashimoto; Hiroaki Araki; Kiyotaka Fukino, and Kiyomi Ejiri, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 18, 1988, Ser. No. 195,224
Claims priority, application Japan, May 18, 1987, 62-120549; Jul. 20, 1987, 62-179141
Int. Cl.[5] G11B 23/00
U.S. Cl. 428—329 5 Claims

1. A magnetic recording medium comprising a nonmagnetic support having thereon a magnetic layer containing a binder which is crosslinkable or polymerizable by radiation irradiation and ferromagnetic particles, said ferromagnetic particles being metal or metal alloy particles mainly comprising iron having a crystal size of 300Å or less, having an atomic ratio of oxygen atoms to iron atoms of from 1.6 to 3.0 on the surface of said particles, and said magnetic layer having been irradiated with radiation.

4,959,264

RELEASE PAPER FOR MAKING ARTIFICIAL LEATHER

Paul Dunk, Slough, Berkshire; Roger M. Hindin, and Peter J. Miles, both of Buckinghamshire, all of England, assignors to The Wiggins Teape Group Limited, Basingstoke, England

Filed Jan. 5, 1988, Ser. No. 141,078
Claims priority, application United Kingdom, Jan. 6, 1987, 8700106
Int. Cl.[5] B32B 5/16; B41M 3/12
U.S. Cl. 428—331 9 Claims

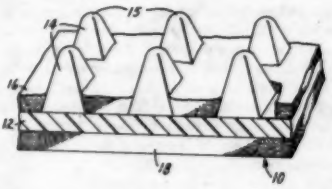
1. A release paper for the manufacture of artificial leather, comprising a paper having a release coating essentially of a flexible poly (4-methyl pentene-1) resin loaded with particulate mineral filler.

4,959,265

PRESSURE-SENSITIVE ADHESIVE TAPE FASTENER FOR RELEASABLY ATTACHING AN OBJECT TO A FABRIC

Leigh E. Wood, Woodbury, and Allen L. Noreen, Lake Elmo, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Apr. 17, 1989, Ser. No. 338,324
Int. Cl.[5] A61F 13/16; C09U 7/02; B32B 3/06
U.S. Cl. 428—343 13 Claims



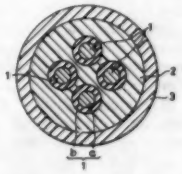
1. Pressure-sensitive adhesive tape fastener comprising
(a) a backing having an array of upstanding stems distributed across at least one face, having bases adjacent said at least one face and projecting outwardly from said face to a tip adapted to penetrate a foraminous substrate and wherein the height of the stem is the distance between the base and the outermost point on said tip, and
(b) a pressure-sensitive adhesive layer on said face partially filling the spaces between the stems where the average adhesive depth is less than the average height of the stems.

4,959,266

URETHANE-RESIN COATED ELECTRICAL WIRE HAVING AN INTERMEDIATE LAYER

Keiji Ueno, Osaka, and Ikujiro Uda, Tochigi, both of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan

Filed Aug. 18, 1986, Ser. No. 898,167
Claims priority, application Japan, Aug. 23, 1985, 60-129446[U]
Int. Cl.[5] B32B 27/00
U.S. Cl. 428—383 6 Claims



1. An electrical wire, comprising:
a stranded core of two or more twisted conductors, each conductor being surrounded by a respective insulation layer;

a thermoplastic resin coating layer covering said stranded core and comprising a thermoplastic resin having a melt index of 0.2 or greater; and

an extrusion-coated urethane resin coating layer covering said thermoplastic resin coating layer, wherein said urethane resin coating layer is made of a composition comprising a thermoplastic urethane resin and a polyfunctional monomer selected from the group consisting of trimethylolpropane triacrylate, trimethylolpropane trimethacrylate and triacrylformal and is crosslinked by radiation.

4,959,267

FIBER REINFORCED RUBBER PRODUCTS

Howard C. H. Ng, Kingston, and Frederick J. Hunter, Oakville, both of Canada, assignors to Du Pont Canada Inc., Mississauga, Canada

Filed Nov. 23, 1988, Ser. No. 276,077

Int. Cl.[5] B32B *9/00, 15/00, 23/00*; D02G *3/00*

U.S. Cl. 428—390 **11 Claims**

1. A reinforcinq material for use in manufacturing fiber reinforced rubber products comprising a thermoplastic fiber coated with a first layer of a cured guanide compound and coated thereover a second layer of adhesive for bonding the fiber to rubber.

4,959,268

POLYMER CONTAINING AMORPHOUS ALUMINOSILICATE PARTICLES AND PROCESS FOR PRODUCING THE SAME

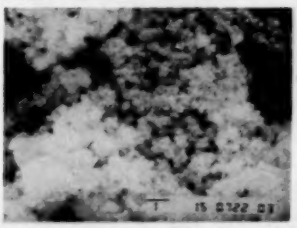
Zenji Hagiwara, Shiga; Satoshi Ando, Osaka; Kunio Ichihashi, Osaka, and Akira Dono, Osaka, all of Japan, assignors to Zenji Hagiwara, Saiga and Kanebo Ltd., Tokyo, both of, Japan

Filed Jul. 14, 1987, Ser. No. 73,448

Claims priority, application Japan, Jul. 16, 1986, 61-167284

Int. Cl.[5] B32B *5/16*; B05D *7/00*; C01B *33/34*

U.S. Cl. 428—403 **8 Claims**



1. A polymer containing amorphous aluminosilicate particles, said polymer comprising an organic polymer and amorphous aluminosilicate solid particles coating agent, at least some of said amorphous aluminosilicate solid particles having antibacterial or bactericidal metal ions on ion-exchangeable sites existing on and within the particles, wherein said amorphous aluminosilicate solid particles have a specific surface area of at least 5 m^2/g and a SiO_2/Al_2O_3 molar ratio of at least 1.3.

4,959,269

STRUCTURES WITH MULTIPLE POLYMERIC LAYERS COMPRISING A LAYER OF VINYLI-DENE FLUORIDE POLYMER BONDED TO A LAYER OF PLASTICIZED VINYL CHLORIDE POLYMER AND USE OF THESE STRUCTURES FOR THE MANUFACTURE OF FLEXIBLE PACKAGING

Claude Debennan, Waterloo, Belgium, assignor to Solvay & Cie (Societe Anonyme), Brussels, Belgium

Filed Dec. 29, 1988, Ser. No. 291,654

Claims priority, application Belgium, Jan. 8, 1988, 08800018

Int. Cl.[5] B32B *27/08*

U.S. Cl. 428—421 **8 Claims**

1. Structures with multiple polymeric layers comprising a layer of vinylidene fluoride polymer bonded to a layer of plasticized vinyl chloride polymer, which are characterized in that the layer of vinylidene fluoride polymer is bonded to the layer of plasticized vinyl chloride polymer by means of a mixture of polymeric adhesives consisting of a copolymer of vinyl acetate and of ethylene and of a copolymer of vinyl chloride and of vinyl acetate, the said mixture containing from 36 to 95% by weight of vinyl acetate and exhibiting a dynamic viscosity equal to at least 55 kPa s at 100° C. and 1 s^{-1},

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4,959,270

LAMINATED STRUCTURE FORMED OF CERAMIC COLOR LAYER AND CONDUCTIVE LAYER

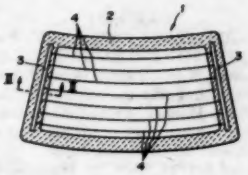
Jun Hasegawa, Osaka, Japan, assignor to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Jul. 20, 1988, Ser. No. 222,107

Claims priority, application Japan, Jul. 20, 1987, 62-110815

Int. Cl.[5] B32B *7/00, 17/06*

U.S. Cl. 428—426 **14 Claims**



1. A laminated structure formed of a ceramic color layer and a conductive layer, comprising:

a ceramic color layer formed on a surface of a glass plate; and

a conductive layer formed on a surface of said ceramic color layer and containing silver ions;

wherein a partial layer constituting at least said ceramic color layer, located on a same side of said plate as said conductive layer is located, comprises a ceramic layer containing a reducing agent.

4,959,271

MULTILAYER SHEET

Yun C. Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Jul. 6, 1988, Ser. No. 215,851

Int. Cl.[5] B32B *27/08*; B28B *3/20*

U.S. Cl. 428—476.3 **32 Claims**

1. A multilayer structure of indefinite running length, said structure comprising:

(A) at least one skin layer of a supporting resin;

(B) a barrier layer comprising a vinylidene chloride interpolymer, the interpolymer being formed from a monomer mixture comprising vinylidene chloride in an amount of from about 60 to about 99 weight percent, based on total weight of monomer mixture, and at least one monoethylenically unsaturated monomer copolymerizable therewith in an amount of from about 40 to about 1 weight percent, based on total weight of monomer mixture; and

(C) at least one tie layer interposed between each skin layer and the barrier layer, said tie layer being present in an amount of between about 5 and about 40 weight percent based on the total weight of the multilayer structure, and said tie layer comprising a graft copolymer polymerized from a polymerizable mixture comprising (a) at least 40 weight percent, based on total polymerizable mixture weight, of a monomer portion having as its major component a monomer selected from the group consisting of vinylidene chloride and C_1–C_8 alkyl methacrylates, and (b) a preformed polymer.

4,959,272

GYPSUM WALLBOARD PAPER HAVING IMITATION MANILA COLORED COATING

William J. Long, Chicago, Ill., assignor to United States Gypsum Company, Chicago, Ill.

Filed Nov. 18, 1986, Ser. No. 932,224
Int. Cl.[5] B32B *13/02*
U.S. Cl. 428—537.7 6 Claims

1. A paper cover sheet particularly designed for use as the face sheet in manufacturing gypsum wallboard, comprising a base formed of a Plurality of filler plies formed from recycled paper pulp, said cover sheet being free of topliner plies and having a coating on the face surface thereof comprising a light colored mineral filler and a binder, thereby providing a finished face surface of light color.

4,959,273

CORROSION-RESISTANT PERMANENT MAGNET AND METHOD FOR PREPARING THE SAME

Atsushi Hamamura, Kyoto; Takaki Hamada; Kouki Tokuhara, both of Takatsuki; Yukimitsu Miyao, Fujiidera; Tomoyuki Imai, and Nanao Horiishi, both of Hiroshima, all of Japan, assignors to Sumitomo Special Metals Co., Ltd. and Toda Kogyo Corp., both of Hiroshima, Japan

Filed Sep. 18, 1989, Ser. No. 408,243
Claims priority, application Japan, Sep. 20, 1988, 63-237125
Int. Cl.[5] B22F *7/00*
U.S. Cl. 428—548 44 Claims

1. A corrosion-resistant permanent magnet formed of a sintered body of a permanent magnet consisting essentially of 10 to 30 atomic % of R, wherein R is at least one of Nd, Pr, Dy, Ho and Tb, or at least one of Nd, Pr, Dy, Ho and Tb and at least one of La, Ce, Sm, Gd, Er, Eu, Tm, Yb, Lu and Y, 2 to 28 atomic % of B and 65 to 80 atomic % of Fe, and having a tetragonal phase as a major phase,

said magnet further comprising on the surface of said sintered body:

a layer of at least one noble metal selected from the group consisting of Pd, Ag, Pt and Au,

an electroless plating layer, formed on the noble metal layer, of at least one base metal selected from the group consisting of Ni, Cu, Sn and Co, and

on the surface of said electroless plating layer, a highly adherent metal coating formed of an electrolytic plating layer of at least one base metal selected from the group consisting of Ni, Cu, Sn and Co,

the permanent magnet exhibiting deterioration of not more than 5% from the initial magnetic properties, when tested, after being tested for 500 hours under the conditions of a temperature of 80° C. and a relative humidity of 90%.

4,959,274

MULTILAYERED IRON-COPPER-LEAD ALLOY BEARING MATERIAL

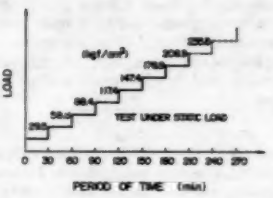
Sanae Mori; Masaaki Sakamoto, both of Nagoya; Koichi Yamamoto, Komaki, and Kenji Sakai, Ichinomiya, all of Japan, assignors to Daido Metal Company, Ltd., Nagoya, Japan

Filed Aug. 21, 1989, Ser. No. 396,393
Claims priority, application Japan, Sep. 14, 1988, 63-230858
Int. Cl.[5] B22F *7/04*
U.S. Cl. 428—555 4 Claims

1. A multilayered iron-copper-lead alloy bearing material in the form of a bimetal, comprising

a steel backing plate;

a sintered iron-based alloy layer comprising 10 to 40 wt. % copper, 1 to 7 wt. % tin, 10 to 40 wt. % lead, 0.5 wt. % or less of phosphorus and the balance iron and incidental impurities;



and a copper plating layer of a thickness of 2 to 20 μm disposed between said steel backing plate and said sintered iron-based alloy layer.

4,959,275

PROCESS AND EQUIPMENT FOR MICRO-PATTERN PORMING ON ROLL SURFACE, METAL SHEETS FOR PRESSWORKING PREPARED BY THE ROLL, AND METHOD OF PREPARING SAME

Takaaki Iguchi; Takanori Tamari; Takaaki Hira; Kunio Isobe; Ikuo Yarita, and Hideo Abe, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Hyog, Japan

Filed Apr. 17, 1989, Ser. No. 339,123
Claims priority, application Japan, Apr. 22, 1988, 63-98296; Jun. 29, 1988, 63-159493; Sep. 5, 1988, 63-220451
Int. Cl.[5] B21D *13/00*; B31F *1/07*; B44C *1/22*; C23J *1/02*
U.S. Cl. 428—603 11 Claims

6. A metallic sheet for use in press forming having on the surface thereof a micro-pattern composed of independent pond-shaped indentations and continuous grooved indentations, said grooved indentations enclosing the pond-shaped indentations and being arranged to form a network.

4,959,276

HEAT-RESISTANT, WEAR-RESISTANT AND HIGH-STRENGTH AL-SI ALLOY, AND CYLINDER LINER EMPLOYING SAME

Yoshitoshi Hagiwara; Eitaro Koya, both of Tokyo; Tetsuya Hayashi, Hyogo, and Yoshinobu Takeda, Hyogo, all of Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka and Honda Motor Co., Ltd., Tokyo, both of, Japan

Filed Oct. 31, 1989, Ser. No. 429,429
Claims priority, application Japan, Oct. 31, 1988, 63-273349
Int. Cl.[5] C22C *21/02*
U.S. Cl. 428—614 3 Claims

1. A heat-resistant, wear-resistant and high-strength Al-Si alloy wherein

(A) 3 to 5% by weight based on the total amount of the alloy of alumina particles having a maximum particle diameter of 30 μm or less and an average particle diameter of 10 μm or less and having shapes with no sharp edge and

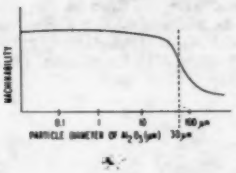
(B) 0.5 to 3% by weight based on the total amount of the alloy of graphite particles having a maximum particle

diameter of 10 μm or less as measured on a cross section of the Al-Si alloy structure

are dispersed in a matrix consisting essentially of ingredients for an Al-Si alloy and having primary Si crystals, the sizes of the primary Si crystals being not larger than 10 μm.

3. A double-layered cylinder liner for use in making an internal combustion engine, which comprises:

an inner layer comprising a heat-resistant, wear-resistant and high-strength Al-Si alloy wherein (A) 3 to 5% by weight based on the total amount of the alloy of alumina particles having a maximum particle diameter of 30 μm or less and an average particle diameter of 10 μm or less and having shapes with no sharp edge and (B) 0.5 to 3% by weight



based on the total amount of the alloy of graphite particles having a maximum particle diameter of 10 μm or less as measured on a cross section of the Al-Si alloy structure are dispersed in a matrix consisting of ingredients for an Al-Si alloy and having primary Si crystals, the sizes of said primary Si crystals being not larger than 10 μm, said inner layer having a thickness of 1 mm or more, and

an outer layer made of a wrought aluminum alloy which has an aluminum content of 90% by weight or more, said outer layer being joined with said inner layer,

the interface between said inner and outer layers and the outer periphery of said outer layer being uneven or corrugated in the circumferential direction.

4,959,277

PROCESS FOR TREATING PLATED STEEL SHEET

Kenshi Saeki, Kurashiki; Takao Ogino, Hiratuka; Noriaki Yoshitake, Hiratsuka; Takumi Honda, Hiratsuka; Akira Nishihara, Yokohama; Hiroshi Okita, Yokosuka; Yukio Tsuge, Ebina, and Haruo Iizuka, Atugi, all of Japan, assignors to Nihon Parkerizing Co., Ltd. and Mitsubishi Kasei Corporation, both of Tokyo, Japan

Filed Dec. 1, 1989, Ser. No. 444,664

Claims priority, application Japan, Dec. 7, 1988, 63-309774

Int. Cl.[5] B32B *15/04, 15/08;* **C25D** *13/06, 13/20*

U.S. Cl. 428—623 **13 Claims**

1. A process for preparing a zinc-plated or zinc alloy-plated steel sheet for cathodic electrodeposition coating, said steel sheet having been chromate-treated, which comprises applying a protective coating material to said plated steel sheet and heat drying the resulting coating to form a protective film on said sheet, said protective coating material having as a principal component of a film-forming organic component a block isocyanate-containing prepolymer containing in one and the same molecule respectively at least one blocked isocyanate group, hydroxyl group, and tertiary amino group, and containing 10–100 parts by weight of silica sol relative to 100 parts by weight of said prepolymer, said coating material having been applied to the surface of said sheet in such a thickness that the resulting dry film is present in an amount of 0.3 g–4 g/m^2 of surface coated.

4,959,278

TIN WHISKER-FREE TIN OR TIN ALLOY PLATED ARTICLE AND COATING TECHNIQUE THEREOF

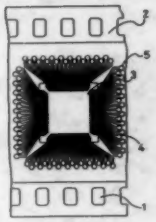
Hidenori Shimauchi, Takatsuki, and Keijiro Suzuki, Tokyo, both of Japan, assignors to Nippon Mining Co., Ltd., Japan

Filed Jun. 8, 1989, Ser. No. 363,615

Claims priority, application Japan, Jun. 16, 1988, 63-146772; Jun. 16, 1988, 63-146894; Jun. 16, 1988, 63-146895

Int. Cl.[5] B32B *15/00;* **C25D** *5/10, 5/50*

U.S. Cl. 428—642 **82 Claims**



1. A tin or tin alloy plated article protected against the generation of tin whiskers characterized in having an indium plated layer on the substrate thereof and a tin or tin alloy plated layer on said indium plated layer.

4,959,279

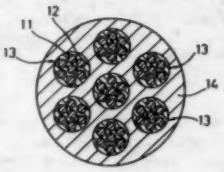
SUPERCONDUCTING WIRE CONTAINING MULTIFILAMENTARY SUPERCONDUCTING ALLOY

Yasuzo Tanaka; Kaname Matsumoto, both of Yokohama, and Yukio Yamada, Kanagawa, all of Japan, assignors to The Furukawa Electric Co., Ltd., Tokyo, Japan

Filed Jan. 17, 1989, Ser. No. 297,949

Int. Cl.[5] H01L *39/24;* **B32B** *15/00*

U.S. Cl. 428—660 **8 Claims**



1. A superconducting wire containing a multifilamentary superconducting alloy, comprising:

at least one composite containing a first matrix in which a plurality of superconducting alloy filaments are arranged, said plurality of superconducting alloy filaments extending parallel to one another in a longitudinal direction of said at least one composite; and

a second matrix in which said at least one composite is embedded, said first matrix consisting essentially of a metal or an alloy which does not form any intermetallic compound with said superconducting alloy filament.

4,959,280

BATTERY ASSEMBLY

Helmut K. Amthor, Rocky River, Ohio, assignor to Eveready Battery Company, Inc., St. Louis, Mo.

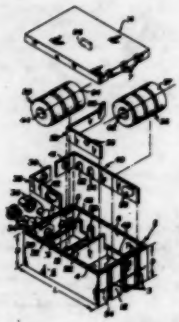
Filed Nov. 13, 1989, Ser. No. 434,371

Int. Cl.[5] H01M *2/06*

U.S. Cl. 429—27 **14 Claims**

1. A battery comprising a plurality of cylindrical cells assem-

bled in a rectangular housing comprising a base, upstanding walls and a cover, and having a length dimension, a width dimension and a depth dimension; an external first terminal spaced apart from an external second terminal on said housing; a first plurality of cylindrical cells connected in series and assembled in said housing such that the longitudinal axis of the cells is parallel to the width dimension of the housing, said first plurality of cells having a positive terminal at one end and a negative terminal at the opposite end; a second plurality of cylindrical cells connected in series and assembled in said housing such that the longitudinal axis of the cells is parallel to the width dimension of the housing and parallel to and in the plane of the longitudinal axis of the first plurality of cells, said



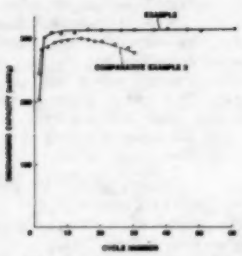
second plurality of cells having a positive terminal at one end and a negative terminal at the opposite end; a first conductive strip electronically connected to the first terminal on said housing at one end and to the positive terminal of said first plurality of cells at the opposite end; a second conductive strip electronically connected to the second terminal on said housing at one end and to the negative terminal of said second plurality of cells at the opposite end; a third conductive strip electronically connected to the negative terminal of said first plurality of cells at one end and to the positive terminal of said second plurality of cells at the opposite end so that all the cells within said housing are connected in series to the external terminals on said housing.

4,959,281

NON AQUEOUS ELECTROLYTE CELL

Yoshio Nishi; Hideto Azuma, and Atsuo Omaru, all of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 29, 1989, Ser. No. 399,982
Claims priority, application Japan, Aug. 30, 1988, 63-217295
Int. Cl.[5] H01M *4/38, 10/40*
U.S. Cl. 429—194 **3 Claims**



1. A non-aqueous electrolyte cell comprising an anode of a carbonaceous material having an interlayer spacing d_{002} of not less than 3.70 A, true density of less than 1.70 g/cm^3 and not having exothermic peak at not less than 700° C. as measured by a differential thermal analysis in air stream,

a cathode containing Li in an amount corresponding to the charging/discharging capacity of not less than 200 mAH per 1 gram of said carbonaceous material; and

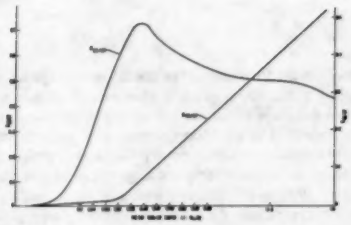
a non-aqueous electrolyte.

4,959,282

CATHODE ACTIVE MATERIALS, METHODS OF MAKING SAME AND ELECTROCHEMICAL CELLS INCORPORATING THE SAME

Jeffery R. Dahn, Surrey, and Brian M. Way, North Vancouver, both of Canada, assignors to Moli Energy Limited, Canada

Filed Jul. 11, 1988, Ser. No. 217,668
Int. Cl.[5] H01M *4/50*; C01G *45/00*; C01D *15/00*
U.S. Cl. 429—224 **19 Claims**



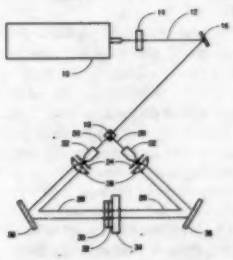
1. A method of making a cathode active material for an electrochemical cell comprising the steps of providing a substantially dry intermediate including a lithium-containing compound and gamma MnO_2 at a mean molar ratio of lithium to gamma MnO_2 of about 0.33 to about 0.43 and heat-treating said intermediate in a drying atmosphere above about 300° C.

4,959,283

DRY FILM PROCESS FOR ALTERING WAVELENGTH RESPONSE OF HOLOGRAMS

William K. Smothers, Hockessin; Krishna C. Doraiswamy; Mark L. Armstrong, both of Wilmington, and Terence J. Trout, Yorklyn, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 144,840, Jan. 15, 1988, abandoned. This application Jul. 14, 1989, Ser. No. 380,933
Int. Cl.[5] G02H *1/04, 1/06*
U.S. Cl. 430—1 **26 Claims**



1. A process for forming a volume phase hologram in a

substantially solid, transparent, photosensitive film element comprising, in sequence:

(a) holographically exposing said film element to coherent light to record a volume hologram within said element; and

(b) contacting said film element with a diffusion element for a time sufficient to modify the wavelength of light response by the hologram.

4,959,284

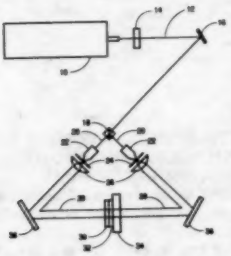
HOLOGRAPHIC PHOTOPOLYMER COMPOSITIONS AND ELEMENTS CONTAINING A RING-OPENING MONOMER

William K. Smothers, Hockessin; Bruce M. Monroe, and Dominic M. T. Chan, both of Wilmington, all of Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 29, 1988, Ser. No. 291,582

Int. Cl.[5] G03H *1/10*

U.S. Cl. 430—2 **14 Claims**



1. In a process for forming a volume reflection hologram by directing a reference beam and an object beam of coherent actinic radiation onto opposite sides of a recording medium, the improvement wherein the recording medium comprises a substrate that supports a substantially solid, photopolymerizable composition consisting essentially of:

(a) 25 to 75% of a solvent soluble, thermoplastic polymeric binder;

(b) 5 to 60% of a monomer capable of addition polymerization, said monomer having a boiling point above 100° C. and polymerizing via free radical ring-opening sigma-bond cleavage;

(c) up to 25% of a plasticizer; and

(d) 0.1 to 10% of a photoinitiator system that activates free radical polymerization of said monomer on exposure to actinic radiation;

wherein said percentages are weight percentages of the total composition.

4. The process of claim 1 wherein said monomer is a vinylcyclopropane.

4,959,285

FLEXOGRAPHIC RELIEF PRINTING PLATE

Gerhard Hoffmann, Otterstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 398,964, Aug. 28, 1989, which is a continuation of Ser. No. 93,170, Sep. 2, 1987, abandoned, which is a continuation of Ser. No. 919,054, Oct. 15, 1986, abandoned. This application Feb. 8, 1990, Ser. No. 476,780

Claims priority, application Fed. Rep. of Germany, Oct. 17, 1985, 3536957

Int. Cl.[5] G03C *3/00*

U.S. Cl. 430—11 **4 Claims**

1. A flexographic relief printing plate comprising a dimensionally stable base and a photopolymerized relief layer which is obtained by imagewise exposing to actinic radiation a photopolymerizable elastomeric relief forming layer of a photopolymerizable element, said relief forming layer consisting essentially of

(a) from 58% to 92% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of a solvent soluble elastomeric diene block copolymer containing at least one vinylaromatic and at least one diene polymer block,

(b) from 2% to 16% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of one or more photopolymerizable, ethylenically unsaturated monomers being compatible with the elastomeric diene block copolymer (*a*),

(c) from 0.4% to 6% by weight, based on the sum of all the components of the photopolymerizable elastomeric relief-forming layer, of one or more photoinitiators, and

(d) from 3% to 22% by weight, based on the sum of the photopolymerizable elastomeric relief-forming layer, of a chloralkane of 8 to 40 carbons which has a chlorine content of about 49% by weight

and then developing the unexposed and unpolymerized areas by liquid solvent washout to obtain said flexographic relief printing plate.

4,959,286

TWO-PASS HIGHLIGHT COLOR IMAGING WITH DEVELOPER HOUSING BIAS SWITCHING

Charles H. Tabb, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 3, 1989, Ser. No. 332,087

Int. Cl.[5] G03G *13/08*

U.S. Cl. 430—45 **10 Claims**

1. The method of forming images, said method including the steps of:

uniformly charging a charge retentive surface to a predetermined voltage level;

forming, on said charge retentive surface at different locations thereof, first image and second latent electrostatic images;

moving said first and second latent electrostatic images sequentially through two developer housings having different kinds of toner contained therein;

electrically biasing said one of said developer housings at a first bias level when one of said images passes therethrough and at a second level as the other of said images passes therethrough whereby development of said said one of said images is effected and development of said other images is precluded; and

electrically biasing the other of said developer housings at a first level when said one of said images passes therethrough and at a second level when said other of said images passes therethrough whereby development of said other image is effected and development of said one image is precluded.

4,959,287

XERORADIOGRAPHIC IMAGING MEMBER

Damodar M. Pai, Fairport; Philip G. Perry, Webster, and Kenneth J. Pheilshifter, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

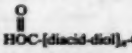
Filed Sep. 27, 1989, Ser. No. 413,402

Int. Cl.[5] G03G *5/047, 13/22*

U.S. Cl. 430—59 **19 Claims**

13. A xeroradiographic imaging member comprising a substrate having an electrically conductive surface, an electroradiographic insulating layer selected from the group consisting of selenium and selenium alloys, and an overcoating layer consisting essentially of nigrosene, a charge transport aromatic amine compound represented by the following formula:

wherein R_1 and R_2 are an aromatic group independently selected from the group consisting of a substituted or unsubstituted phenyl group, naphthyl group, and polyphenyl groups and R_3 is selected from the group consisting of a substituted or unsubstituted aryl group, alkyl group having from 1 to 18 carbon atoms and cycloaliphatic compounds having from 3 to 18 carbon atoms and a copolyester resin represented by the following formula:



wherein said diacid is selected from the group consisting of terephthalic acid, isophthalic acid, and mixtures thereof, said diol comprises ethylene glycol, the mole ratio of said diacid to said diol is about 1:1, n is a number between about 175 and about 350 and the T_g of said copolyester resin is between about 50° C. about 80° C.

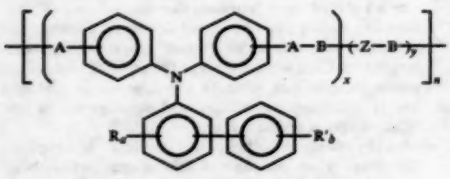
4,959,288

PHOTOCONDUCTIVE IMAGING MEMBERS WITH DIARYL BIARYLYLAMINE COPOLYMER CHARGE TRANSPORT LAYERS

Beng S. Ong, Mississauga; Barkev Keoshkerian, Thornhill; Giuseppe Barazyi, and Dasarao K. Murti, both of Mississauga, all of Canada, assignors to Xerox Corporation, Stamford, Conn.

Filed Apr. 3, 1989, Ser. No. 332,207
Int. Cl.[5] G03G 5/10
U.S. Cl. 430—59 **35 Claims**

1. A photoconductive imaging member comprised of a photogenerating layer, and a charge transport layer comprised of diaryl biarylylamine copolymers of the formula



wherein A and B are independently selected from bifunctional linkages; Z is alkylenedioxy, arylenedioxy, or substituted derivatives thereof; R and R' are alkyl, aryl, substituted alkyl, substituted aryl, alkoxy, or halogen; x and y are mole fractions wherein x and y are greater than 0 and the sum of x and y is equal to 1.0; a and b are the numbers 0, 1 or 2; and n represents the number of repeating segments.

4,959,289

ELECTROPHOTOGRAPHIC ELEMENT HAVING A SURFACE LAYER AND METHOD FOR PRODUCING SAME

Masayuki Nishikawa, and Shigeru Yagi, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Jan. 3, 1989, Ser. No. 292,984
Claims priority, application Japan, Jan. 8, 1988, 63-1359
Int. Cl.[5] G03G 5/082
U.S. Cl. 430—64 **7 Claims**

1. An electrophotographic element comprising:

a support member serving as a substrate;

a photosensitive layer deposited on said support member through a glow discharge decomposition process and including amorphous silicon doped with an impurity, said impurity including boron;

a surface layer having a reflectance factor of 0.1 or less for laser light in a wavelength range of 780 nm, said surface layer being deposited on said photosensitive layer through a glow discharge decomposition process, including amorphous silicon doped with nitrogen atoms, and having an atom-number ratio of nitrogen to silicon of 0.5 or greater.

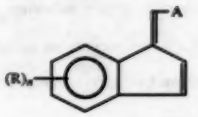
4,959,290

BENZYLIDENEINDENE COMPOUNDS AND ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR USING THE SAME

Tamotsu Aruga, Numazu; Masaomi Sasaki, Susono, and Mitsuru Hashimoto, Numazu, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

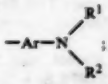
Filed Dec. 8, 1988, Ser. No. 281,210
Claims priority, application Japan, Dec. 8, 1987, 62-308597; Mar. 8, 1988, 63-054548
Int. Cl.[5] G03G 5/14, 5/06
U.S. Cl. 430—73 **12 Claims**

1. An electrophotographic photoconductor comprising an electroconductive support and a photoconductive layer formed thereon comprising at least one indenylidene compound having the formula (I):



(I)

wherein A represents a N-substituted carbazolyl group or



wherein

Ar represents an aromatic hydrocarbon group or a heterocyclic group; and R^1 and R^2 each represent a substituted or unsubstituted alkyl group, or an aryl group which may have a substituent,

R represents an alkyl group, an alkoxyl group or a halogen; and n is an integer of 0 to 4, and when n is 2, 3 or 4, Rs may be the same or different.

4,959,291

LIGHT-SENSITIVE MATERIAL CONTAINING SILVER HALIDE, REDUCING AGENT, POLYMERIZABLE COMPOUND AND A DIAZAPHTHALIDE DYE

Toru Harada, and Toshiyuki Watanabe, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

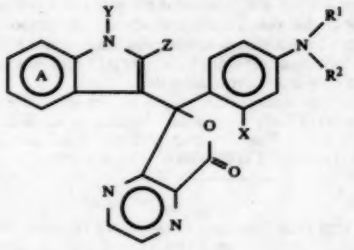
Continuation of Ser. No. 115,067, Oct. 30, 1987, abandoned. This application Aug. 8, 1989, Ser. No. 391,663

Claims priority, application Japan, Oct. 30, 1986, 61-259967

Int. Cl.[5] G03C *1/68, 1/733, 11/12*

U.S. Cl. 430—138 **6 Claims**

1. A light-sensitive material comprising a light-sensitive layer containing a silver halide, a reducing agent, an ethylenically unsaturated polymerizable compound and a leuco dye provided on a support, wherein the leuco dye has the following formula (I):



(I)

in which each of R^1 and R^2 independently is a monovalent group selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, an aralkyl group and an aryl group, or R^1 and R^2 together with the neighboring nitrogen atom form a 5- or 6-membered ring; X is a monovalent group selected from the group consisting of hydrogen, a halogen atom, an alkyl group, an alkoxy group, —NHCOR[3], wherein R^3 is an alkyl group or an aryl group, —OCOR[4], wherein R^4 is an alkyl group or an aryl group, and —NR^5R^6, wherein R^5 and R^6 have the same meanings as for R^1 and R^2; Y is an alkyl group or an aralkyl group; Z is a monovalent group selected from the group consisting of hydrogen, an alkyl group and an aryl group; each of R^1, R^2, R^3, R^4, R^5, R^6, X Y, Z and the benzene ring A may have one or more substituent groups; and at least one of R^1, R^2 and Y is an alkyl group having 5 or more carbon atoms.

4,959,292

LIGHT-SENSITIVE O-QUINONE DIAZIDE COMPOSITION AND PRODUCT WITH PHENOLIC NOVOLAK PREPARED BY CONDENSATION WITH HALOACETOALDEHYDE

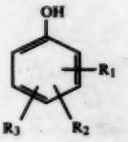
Andrew J. Blakeney, Seekonk, Mass.; Thomas Sarubbi, Providence, R.I., and Joseph J. Sizensky, Seekonk, Mass., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Filed Jul. 11, 1988, Ser. No. 217,512

Int. Cl.[5] G03C *1/60*; G03F *7/023*

U.S. Cl. 430—165 **18 Claims**

1. A light-sensitive composition comprising an admixture of at least one light-sensitive o-quinonediazide compound and a binder phenolic novolak resin comprising the product of a condensation reaction of an aldehyde comprising a haloacetaldehyde source or a mixture of a haloacetoaldehyde source and a formaldehyde source with a phenolic monomer comprising at least one compound of the formula:



wherein R_1, R_2 and R_3 are individually selected from hydrogen or a one to four carbon alkyl group and wherein the ratio of total carbon atoms in the sum of R_1, R_2 and R_3 to the total number of phenolic nuclei in said resin is from about 0.5:1 to about 1.5:1 in the presence of a solvent; said resin made by employing a molar ratio of total aldehyde to total phenolic monomers from about 0.33:1 to about 0.70:1, the amount of said o-quinonediazide compound or compounds being about 5% to about 40% by weight and the amount of said binder resin being about 60% to 95% by weight, based on the total nonvolatile solids content of said light-sensitive composition.

4,959,293

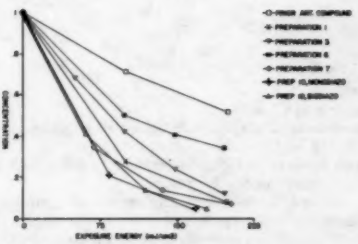
DEEP UV PHOTORESIST WITH ALKYL 2-DIAZO-1-ONES AS SOLUBILITY MODIFICATION AGENTS

George Schwartzkopf, Franklin Township, Somerset County, N.J.; John B. Covington, and Kathleen B. Gabriel, both of Bethlehem, Pa., assignors to J. T. Baker, Inc., Phillipsburg, N.J.

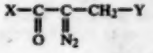
Filed Oct. 28, 1988, Ser. No. 264,335

Int. Cl.[5] G03F *7/004, 7/022*; G03C *1/54*

U.S. Cl. 430—189 **23 Claims**



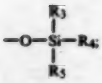
1. A lithographic deep UV light sensitive positive photoresist composition for use with deep UV light of less than 300 nm comprising a base soluble film-forming photoresist polymer and in admixture therewith an effective amount of a deep UV photosensitive solubility modification agent compound of the formula:



(Formula I)

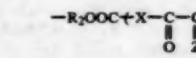
wherein:

X and Y are straight or branch chain alkyl or substituted alkyl radicals which may be joined together to form an unsubstituted or substituted straight or branched alkyl or fused ring alkyl chain and wherein the alkyl or fused ring alkyl radicals may be substituted with a radical selected from the group consisting of —$COOR_1$ or



wherein:

R_1 is a straight or branched chain alkyl radical of from 1 to about 20 carbon atoms or



in which R_2 is alkyl of from 1 to 20 carbon atoms;

Z is H_2 or N_2;

X and Y are as defined hereinbefore; and

R_3, R_4 and R_5 are each independently alkyl of from 1 to 20 carbon atoms.

4,959,294

INFRA-RED SENSITISING DYES FOR SILVER HALIDE

Bernard A. Lea; Ronald W. Burrows; Thomas D. G. Hellings, all of Harlow, England; Charles G. Barlow, and Ivan H. Skoog, both of St. Paul, Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

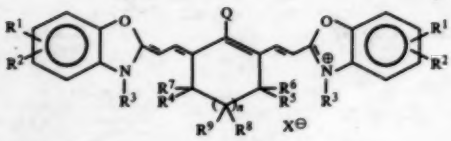
Filed Apr. 14, 1988, Ser. No. 181,545

Int. Cl.[5] G03C *1/20*

U.S. Cl. 430—204 **10 Claims**

3. A photographic silver halide emulsion sensitive to infra-red radiation characterised in that it comprises from 0.5 to 500 mg per mole of silver halide of a dye of the general formula:

(IV)



in which:

Q represents Cl or Br,

R^3 represents an alkyl or substituted alkyl group,

n is 0, 1, 2 or 3,

X is an anion of molecular weight up to 400 which may be incorporated in one R^3 group,

each R^1 and R^2 independently represent hydrogen or a substituent of the type present in cyanine dyes,

R^4 to R^9 each independently represent hydrogen or a lower alkyl group of 1 to 3 carbon atoms or any two of these substituents on adjacent carbon atoms may together represent the necessary atoms to complete a fused benzene ring, if n=0.

4,959,295

PROCESS OF MAKING A PHOTOSENSITIVE SEMI-AQUEOUS DEVELOPABLE CERAMIC COATING COMPOSITION

William J. Nebe, Wilmington, Del., and James J. Osborne, Kennett Square, Pa., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 200,386, May 31, 1988, Pat. No. 4,908,296. This application Nov. 3, 1989, Ser. No. 431,223

Int. Cl.[5] G03C *1/68*

U.S. Cl. 430—281 **3 Claims**

1. In a method of making a photosensitive ceramic coating composition which is fireable in a substantially nonoxidizing atmosphere comprising an admixture of:

(a) finely divided particles of ceramic solids having a surface area-to-weight ratio of no more than 10 m^2/g and at least 80 wt. % of the particles having a size of 1–10 μm, and

(b) finely divided particles of an inorganic binder having a glass transition temperature in the range from of 550° to 825° C., a surface area-to-weight ratio of no more than 10 m^2/g and at least 90 wt. % of the particles having a size of 1–10 μm, the weight ratio of (b) to (a) being in a range from 0.6 to 2, dispersed in an organic medium comprising

(c) an organic polymeric binder, and

(d) a photoinitiation system, dissolved in

(e) photohardenable monomer, and

(f) an organic medium

wherein the improvement comprises an organic polymeric binder containing a copolymer or interpolymer of a C_1–C_{10} arkyl acylate or C_1–C_{10} alkyl methacrylate, or combinations thereof and an ethylenically unsaturated carboxylic acid, wherein a moiety in the binder derived from the unsaturated carboxylic acid comprises from 5 to less than 15 weight percent of the polymer and wherein the binder has a molecular weight not greater than 100,000 and wherein the composition upon imagewise exposure to actinic radiation is developable in an aqueous solution containing by weight 0.62 percent sodium borate and 8.7 percent butyl cellosolve

wherein prior to mixing of component (a), (b), (c), (d), (e), (f), component (a) of finely divided particles of ceramic solids and component (b) of finely divided particles of an inorganic binder are freeze dried in formation of such particles.

4,959,296

PROCESS FOR THE DEVELOPMENT OF DRY PS PLATES

Susumu Yoshida; Tatsuji Higashi, and Hiroshi Takahashi, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan

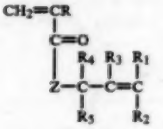
Filed Dec. 14, 1988, Ser. No. 284,400

Claims priority, application Japan, Dec. 16, 1987, 62-317843

Int. Cl.[5] G03F *7/02*

U.S. Cl. 430—302 **19 Claims**

1. A process for the development of an exposed dry PS plate comprising a substrate provided thereon with (1) a primer layer, (2) a photopolymerizable light-sensitive layer comprising (a) a water-soluble or water-swellable copolymer comprising, as copolymerizable components, at least one monomer represented by the following general formula (I):



wherein R represents a hydrogen atom or a methyl group; R_1 to R_5 each represents a hydrogen atom, a halogen atom, a carboxyl group, a sulfo group, a nitro group, a cyano group, an amido group, an amino group, an alkyl group, an aryl group, an alkoxy group, an aryloxy group, an alkylamino group, an arylamino group, an alkylsulfonyl group or an arylsulfonyl group; and Z represents an oxygen or sulfur atom or a group: —NH— or —NR′— (wherein R′ represents an alkyl group) and an ethylenically unsaturated monomer having hydrophilic groups; (b) a monomer or an oligomer having at least one photopolymerizable ethylenically unsaturated double bond; and (c) a photopolymerization initiator and (3) a silicone rubber layer in this order, said process comprising, after imagewise exposure, contacting said plate with a developer to remove said photopolymerizable light-sensitive layer and corresponding areas of said silicone rubber layer in non-exposed areas to give a dry lithographic printing plate, and wherein a developer comprises:

(i) an organic solvent which can dissolve or swell the non-

exposed areas of the photopolymerizable light-sensitive layer and whose solubility in water at ordinary temperature is not more than 20% by weight;

(ii) a surfactant; and

(iii) water, the developer being substantially free from any organic solvent capable of swelling the silicone rubber layer.

4,959,297

TERNARY PHOTOINITIATOR SYSTEM FOR ADDITION POLYMERIZATION

Michael C. Palazzotto, Saint Paul, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 130,606, Dec. 19, 1987, Pat. No. 4,889,792. This application Nov. 22, 1989, Ser. No. 440,999

Int. Cl.[5] G03C 1/725, 1/053

U.S. Cl. 430—322 15 Claims

1. A method for addition photopolymerization comprising the step of irradiating a photopolymerizable composition comprising:

(a) at least one vinyl monomer capable of undergoing free-radical polymerization, and

(b) a photoinitiator system comprising photochemically effective amounts of

(i) a diaryliodonium salt,

(ii) an organic or inorganic pigment, insoluble in the photopolymerizable composition, which serves as a sensitizer, and

(iii) at least one electron donor compound, said donor compound being different from said pigment and having a potential between about 0.5 and 1.5 volts versus a saturated calomel electrode,

with light having a wavelength between about 300 and about 1000 nanometers until said composition gels or hardens.

4,959,298

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIAL

Akio Mitsui, and Takashi Ozawa, both of Minami Ashigara, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

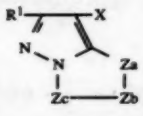
Continuation of Ser. No. 915,585, Oct. 6, 1986, abandoned. This application Oct. 7, 1988, Ser. No. 256,128

Claims priority, application Japan, Oct. 4, 1985, 60-221499; Jan. 8, 1986, 61-1866

Int. Cl.[5] G03C 7/38, 7/392

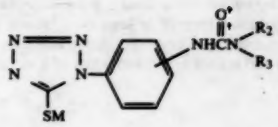
U.S. Cl. 430—496 10 Claims

1. A silver halide color photographic material, comprising a support having provided thereon at least one silver halide emulsion layer, and at least one magenta coupler represented by the following general formula (I)



(I)

wherein R^1 represents a hydrogen atom or a substituent; X represents a hydrogen atom or a coupling releasing group upon a coupling reaction with the oxidation product of an aromatic primary amine developing agent; Za, Zb and Zc each represents a methine group, a substituted methine group, =N— or —NH—; one of the Za—Zb bond and the Zb—Zc bond is a double bond while the other is a single bond; and Zb—Zc may be fused to an aromatic ring, said coupler may form a dimer or a higher polymer by linking at the R^1 or X position, and when Za, Zb or Zc is a substituted methine group, said coupler may form a dimer or a higher polymer through said substituted methine group, and at least one compound represented by the following general formula (II):



(II)

wherein M represents a hydrogen atom, an alkali metal atom, a quaternary ammonium group or a group that can be cleaved under alkaline conditions; and R_2 and R_3, which may be the same as or different from each other, represent a hydrogen atom, a substituted or unsubstituted aliphatic hydrocarbon group, or a substituted or unsubstituted aromatic hydrocarbon group, or R_2 and R_3 may form together a ring, wherein said silver halide color photographic material is in the form of a packaged product and the relative humidity in said package product is up to about 58%.

4,959,299

SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Kei Sakanoue; Hidetoshi Kobayashi; Seiji Ichijima, and Shinji Ueda, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 7, 1988, Ser. No. 164,655

Claims priority, application Japan, Mar. 5, 1987, 62-50683

Int. Cl.[5] G03C 7/32, 7/42

U.S. Cl. 430—544 8 Claims

1. A silver halide color photographic material comprising at least one silver halide emulsion layer on a support wherein,

at least one type of development inhibitor releasing type coupler is present which, by means of a coupling reaction with the oxidized form of a primary aromatic amine developing agent, releases a precursor of a compound, the precursor inhibiting the development of silver halide which subsequently, by means of an electron transfer reaction via an ethylenic conjugated chain, releases a compound which inhibits the development of silver halide, and

at least one type of bleach accelerating agent releasing type coupler is present which, by means of a coupling reaction with the oxidized form of a primary aromatic amine developing agent, releases a bleach accelerating agent or a precursor thereof.

4,959,300

SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL WITH IMPROVED GRADATION BALANCE

Toyoki Nishijima, and Kaoru Onodera, both of Odawara, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Apr. 12, 1988, Ser. No. 180,478

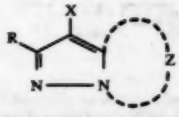
Claims priority, application Japan, Apr. 15, 1987, 62-90676

Int. Cl.[5] G03C 1/38, 7/38

U.S. Cl. 430—546 7 Claims

1. A silver halide photographic light-sensitive material comprising a support having thereon at least one silver halide emulsion layer, wherein said silver halide photographic light-sensitive material contains a magenta coupler represented by the Formula M-1

Formula M-1



wherein Z represents a group of non-metal atoms necessary for forming a nitrogen-containing heterocyclic which may have a substituent group; X represents a hydrogen atom, or a group capable of being split off upon the reaction with the oxidized

product of a color developing agent; and R represents a hydrogen atom or a substituent; and at least one surface active agent having in the molecule thereof at least two groups selected from the group consisting of a carboxy group and salts thereof, a sulfonic group and salts thereof, and a salt of a sulfuric ester group.

4,959,301

PROCESS FOR RAPIDLY ENUMERATING VIABLE ENTITIES

James C. Weaver, Sudbury; Jonathan G. Bliss, Somerville; Gregory B. Williams, Tewksbury; Kevin T. Powell, Boston, and Gail I. Harrison, Watertown, all of Mass., assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Apr. 22, 1988, Ser. No. 185,083
Int. Cl.[5] C12Q *1/70, 1/02*
U.S. Cl. 435—5 **12 Claims**

1. A method of determining the number of viable biological entities capable of growth per volume of a sample, comprising:

(a) forming microdroplets from a volume of the sample wherein some but not all of the microdroplets contain viable biological entities;

(b) measuring the volumes of at least a portion of the microdroplets formed in step (a) to obtain the volumes of the microdroplets;

(c) measuring the amount of biological material which constitutes part of the viable biological entities in the microdroplets; and

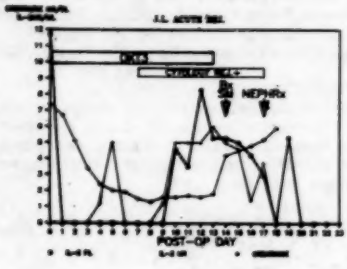
(d) determining the statistical distribution of the biological material in the microdroplet volumes as indicative of the number of viable biological entities per volume of the sample.

4,959,302

METHOD OF EVALUATING IMMUNE SYSTEM RESPONSE TO ALLOGRAFTS, VIRAL INFECTION AND IMMUNOSUPPRESSIVE THERAPY

Andrew J. Cornaby, Boston, and Roy A. Dempsey, Cambridge, both of Mass., assignors to Endogen, Inc., Boston, Mass.

Filed Aug. 20, 1987, Ser. No. 87,630
Int. Cl.[5] G01N *33/543, 33/569*
U.S. Cl. 435—5 **22 Claims**



1. A method of determining the status of an allograft recipient comprising measuring IL-2 levels in a biological fluid taken from the recipient after receipt of the allograft and comparing the levels obtained to predetermined levels as an indication of acceptability of the allograft.

4,959,303

ASSAY FOR ANTIGENS BY BINDING IMMUNE COMPLEXES TO SOLID SUPPORTS FREE OF PROTEIN AND NON-IONIC BINDERS

Gary L. Milburn, Sunnyvale; Judith Rabbie, Palo Alto, and Thomas M. Houts, Mountain View, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Dec. 21, 1987, Ser. No. 135,869
Int. Cl.[5] G01N *33/53, 33/536, 33/537;* C12Q *1/02*
U.S. Cl. 435—7 **79 Claims**

1. A method for detecting an antigen in a biological sample suspected of containing an antigen, said method comprising

a. providing in combination a solid support, which is hydrophobic or positively charged and substantially free of proteins, binding partners specific for said antigen, binding partners specific for antibody specific for said antigens, and non-ionic binders for an immune complex of said antigen and said antibody, and an aqueous medium comprising an antigen from said sample and an antibody specific for said antigen;

b. incubating said combination under conditions sufficient for said antibody when bound to said antigen to bind to said support; and

c. determining the antibody bound to said support or in said medium, the presence or amount thereof being related to the presence of antigen in said sample.

4,959,304

PRODUCTION OF MONOCLONAL ANTIBODIES TO TREPONEMA DENTICOLA BY HYBRIDOMA TDIII, IIIBB2

Lloyd G. Simonson, Deerfield, Ill., assignor to United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 22, 1989, Ser. No. 355,575
Int. Cl.[5] C12Q *1/00;* C07K *15/00*
U.S. Cl. 435—7 **25 Claims**

1. A monoclonal antibody reactive to *Treponema denticola* produced by the hybridoma deposited under accession number ATCC HB 9967.

2. A diagnostic reagent comprising the monoclonal antibody of claim 1 linked directly or indirectly to a detectable label.

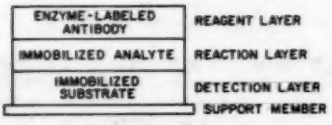
3. A diagnostic reagent according to claim 2, wherein the detectable label is an enzyme.

4,959,305

REVERSIBLE IMMOBILIZATION OF ASSAY REAGENTS IN A MULTIZONE TEST DEVICE

David L. Woodrum, Rancho Palos Verdes, Calif., assignor to Miles Inc., Elkhart, Ind.

Continuation of Ser. No. 875,464, Jun. 18, 1986, abandoned. This application Oct. 31, 1988, Ser. No. 265,303
Int. Cl.[5] G01N *31/22, 33/53*
U.S. Cl. 435—7 **20 Claims**



1. A multizone test device for the immunoassay determination of an antigen or hapten analyte in a liquid test medium, comprising, in fluid flow contact,

(a) a reagent zone comprising a solid, porous matrix and a labeled reagent reversibly immobilized therein by a binding interaction between the labeled reagent and the matrix that is sufficiently disruptable by contact of the matrix

with a predetermined component of the test medium other than the analyte to release and thereby render diffusible an analytically effective amount of the labeled reagent independent of the presence or amount of analyte in the liquid test medium, the labeled reagent comprising one of the pair

(i) the analyte or a binding analog thereof, and

(ii) an antibody which binds the analyte labeled with a detectable chemical group,

(b) a reaction zone comprising a solid, porous matrix incorporated with an immobilized form of the other of said pair which interacts with both of the analyte and the labeled reagent to bind and thereby immobilize labeled reagent while leaving an amount of the labeled reagent diffusable as a function of the amount of analyte in the liquid test medium, and

(c) a detection zone comprising a solid, porous matrix for receiving labeled reagent which is free to diffuse thereinto from the reaction zone to provide a detectable signal related to the amount of analyte present in the liquid test medium.

4,959,306

LABELING DESIGN FOR A BINDING ASSAY REAGENT

Naomi Kameda, Woodside, and Gerald L. Rowley, San Jose, both of Calif., assignors to Sclavo, Inc., Sunnyvale, Calif.

Filed Nov. 28, 1986, Ser. No. 935,952

Int. Cl.[5] G01N *33/53, 33/563, 33/531;* G12N *11/06*

U.S. Cl. 435—7 **21 Claims**

1. A method to label a specific reaction partner (SRP) useful in a binding assay, which method comprises:

(a) conjugating label to a spacer protein selected from the group consisting of human alphal-antitrypsin, mercaptoalbumin, and fragments of rabbit IgG containing only one—SH group, which spacer protein (SP) contains only one reactive center capable of combining with one of the functional groups of a heterobifunctional linker;

(b) reacting one of the labeled SP or the SRP with a heterobifunctional linker under conditions wherein the labeled SP or the SRP so reacted is capable of reacting with only a first functional group of the heterobifunctional linker, to obtain a product of said one of labeled SP or SRP conjugated to linker and

(c) reacting the product of said one of labeled SP or SRP conjugated to linker with the other of the SP or SRP wherein the reaction of linker to SP employs said one reactive center.

4,959,307

IMMUNOSEPARATING STRIP

John D. Olson, Sunnyvale, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Filed Sep. 5, 1986, Ser. No. 904,597

The portion of the term of this patent subsequent to Apr. 26, 2005, has been disclaimed.

Int. Cl.[5] G01V *33/535, 33/543, 33/558*

U.S. Cl. 435—7 **29 Claims**

1. A method for determining the presence of an analyte, that is capable of binding specifically to an antibody, in a sample suspected of containing said analyte, which comprises:

(a) contacting, with a test solution containing said sample, antibodies to said analyte and a conjugate of said analyte and a label, a contact portion of a strip of bibulous material capable of being traversed by said test solution by capillary migration, said strip containing non-diffusively bound to a situs on said strip separated from said contact portion a first receptor capable of binding to said conjugate, the surface area of said situs being less than that of said strip, said strip further containing a second receptor capable of binding said antibodies to said analyte, said second receptor being non-diffusively bound to said strip between said situs and said contact portion,

(b) allowing at least a portion of said test solution to traverse said strip by capillary migration and thereby contact said situs,

(c) exposing said strip to a signal producing means capable of interacting with said label to produce a signal in relation to the amount of analyte in the test solution, and

(d) detecting said signal at said situs and relating said signal to the presence of said analyte.

4,959,308

IMMUNOASSAY FOR ANTIBODIES BINDING PLATELETS

Daryl M. Ogden, Houston, Tex., assignor to Board of Regents, The University of Texas System, Austin, Tex.

Filed Aug. 27, 1987, Ser. No. 89,884

Int. Cl.[5] C07K *17/00;* G01N *33/543*

U.S. Cl. 435—7 **17 Claims**

1. A method for producing a substrate useful in the detection of antibodies directed against platelet antigens, the method comprising the steps of:

treating a platelet sample with an aqueous solution comprising a nonionic detergent to solubilize platelet antigens comprising HLA and platelet-specific antigens of the sample and to produce a lysate, said nonionic detergent being sufficiently separable from the lysate to minimize interference with subsequent binding of antibodies directed against platelet antigens to platelet antigens;

separating insoluble particles and excess detergent from the lysate to produce a solution comprising solubilized platelet antigens;

contacting said solution with matrix-bound human IgG to remove substances nonimmunospecifically binding to the matrix-bound human IgG from said solution to thereby produce partially purified platelet antigens; and

affixing the partially purified platelet antigens to a solid matrix to produce a substrate useful in the detection of antibodies directed against platelet antigens.

4,959,309

FAST PHOTOCHEMICAL METHOD OF LABELLING NUCLEIC ACIDS FOR DETECTION PURPOSES IN HYBRIDIZATION ASSAYS

Nanibhushan Dattagupta, New Haven, and Donald M. Crothers, Northford, both of Conn., assignors to Molecular Diagnostics, Inc., West Haven, Conn.

Continuation of Ser. No. 611,668, May 18, 1984, Pat. No. 4,737,454, which is a continuation-in-part of Ser. No. 513,932, Jul. 14, 1983, abandoned. This application Oct. 9, 1987, Ser. No. 107,183

The portion of the term of this patent subsequent to Apr. 12, 2005, has been disclaimed.

Int. Cl.[5] C12Q *1/68;* C07H *21/00;* C07D *493/04;* G01N *33/53*

U.S. Cl. 435—6 **36 Claims**

1. A labeled hydribizable nucleic acid comprising (a) a nucleic acid component, (b) a nucleic acid-binding ligand photochemically linked to the nucleic acid component thereby modifying the nucleic acid such that the frequency of modification along a hybridizable single stranded portion of the nucleic acid not be so great as to substantially prevent hybridization, and (c) a label chemically linked to (b), said label selected from the group consisting of fluorescein and phycobiliprotein.

4,959,310

MONOCLONAL ANTIBODIES TO SOYBEAN KUNITZ TRYPSIN INHIBITOR AND IMMUNOASSAY METHODS

David L. Brandon, Berkeley; Anne H. Bates, LaFayette, and Mendel Friedman, Moraga, all of Calif., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Sep. 28, 1987, Ser. No. 101,918

Int. Cl.[5] C12P *21/08;* C12N *5/18;* G01N *33/577;* A61K *39/395*

U.S. Cl. 435—7 **3 Claims**

1. A continuous hybrid cell line which produces and secretes

monoclonal antibody specific for soybean Kunitz trypsin inhibitor (KTI) which:

(a) re acts and binds with KTI isoforms a and b;

(b) does not react with Bowman-Birk inhibitors;

(c) does not react with KTI isoforms a and b which have been denatured by moist heat or alkaline treatment or which have been subjected to disulfide exchange; and

(d) does not react with KTI isoform c;

wherein said cell line is ATCC HB 9517.

4,959,311

METHOD OF DEGRADING KERATINACEOUS MATERIAL AND BACTERIA USEFUL THEREFORE

Jason C. H. Shih, and C. Michael Williams, both of Cary, N.C., assignors to North Carolina State University, Raleigh, N.C.

Filed Mar. 31, 1988, Ser. No. 175,476

Int. Cl.[5] C12P *21/00*; C12N *1/00, 9/56*; C12R *1/10*

U.S. Cl. 435—68.1 **22 Claims**

1. A method of degrading keratinaceous material, comprising the steps of combining keratinaceous material with *Bacillus licheniformis* PWD-1 (PWD-1) to form a fermentation media, and then fermenting the media for a time sufficient to degrade the keratinaceous material.

4,959,312

FULL SPECTRUM MUTAGENESIS

Karl M. Sirotkin, Knoxville, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed May 31, 1985, Ser. No. 739,962

Int. Cl.[5] C12P *19/34*

U.S. Cl. 435—91 **22 Claims**

1. An in vitro method fo mutagenesis of a target DNA sequence comprising:

producing a supply of a template for the target sequence;

producing random primers having differing 3'—OH termini with each having a region complementary to said template adjacent to said 3'—OH termini;

extending said random primers randomly from said 3'—OH termini by at least two deoxynucleotides to produce modified random primers, at least some of which have at least one nucleotide which is mismatched with respect to the template; wherein said step of extending said random primers is accomplished by random addition of nucleotides with terminal transferase in the presence of the four nucleotides at appropriate concentrations so that the probability of addition of any of the four nucleotides is approximately equal at any one site,

employing said modified random primers as primers for DNA polymerization and polymerizing DNA along said template to form at least some mutagenized DNA containing double stranded regions each having a newly-polymerized strand with at least one nucleotide which is mismatched with respect to the template;

transferring at least nucleic acid containing the equivalent sequence information of said newly-polymerized strands of said mutagenized DNA into organisms to cause at least some of said nucleic acid to be replicated in said host organisms to produce mutant DNA sequences;

growing said host organisms to produce a population of clones containing a variety of mutant DNA sequences;

selecting at least one clone from the population having selected characteristics; and

growing host organisms containing mutant DNA sequences of said selected clones to amplify said sequences.

4,959,313

CELLULAR ENHANCER FOR EXPRESSING GENES IN UNDIFFERENTIATED STEM CELLS

Makoto Taketo, Bar Harbor, Me., assignor to The Jackson Laboratory, Bar Harbor, Me.

Filed Jun. 22, 1987, Ser. No. 64,665

Int. Cl.[5] C12N *15/00*; C12P *21/00*; C07H *15/12*

U.S. Cl. 435—69.1 **22 Claims**

1. An isolated cellular enhancer nucleotide sequence comprising:

CCTGGGCTCTACAGCAGAAGTCTAAGGGGAAAAGCT
TAGGGAGGAATGCCTGGCAAAGGCCCTCATTACTTA
AGAAACAAGTCCTGACTTCAAAGTGAGCTCCCC.

4,959,314

CYSTEINE-DEPLETED MUTEINS OF BIOLOGICALLY ACTIVE PROTEINS

David F. Mark, Danville; Leo S. Lin, Fremont, and Shi-da Yu Lu, Cupertinos, all of Calif., assignors to Cetus Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 564,224, Dec. 20, 1983, Pat. No. 4,518,584, which is a continuation-in-part of Ser. No. 486,162, Apr. 15, 1983, abandoned, which is a continuation-in-part of Ser. No. 435,154, Oct. 19, 1982, abandoned, which is a continuation of Ser. No. 695,934, Feb. 7, 1985, Pat. No. 4,959,314, which is a continuation-in-part of said Ser. No. 670,360, is a continuation-in-part of Ser. No. 661,026, Oct. 15, 1984, abandoned. This application Feb. 7, 1985, Ser. No. 698,939. The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.

Int. Cl.[5] C12P *21/00, 19/34, 21/22*

U.S. Cl. 435—69.1 **22 Claims**

1. A synthetic mutein of a biologically active native protein which native protein has at least one cysteine residue that is free to form a disulfide link and is nonessential to said biological activity, said mutein having at least one of said cysteine residues substituted by another amino acid and said mutein exhibiting the biological activity of said native protein.

4,959,315

BIODEGRADATION OF CHLOROETHYLENE COMPOUNDS

Michael J. K. Nelson, Pensacola, Fla.; Al W. J. Bourquin, Redmond, Wash., and Parmely H. Pritchard, Gulf Breeze, Fla., assignors to The United States of America as represented by the Administrator of the Environmental Protection Agency, Washington, D.C.

Filed Apr. 30, 1987, Ser. No. 44,213

Int. Cl.[5] C02F *3/34*; C12N *1/28*; C12P *5/02*

U.S. Cl. 435—167 **12 Claims**

1. A method of degrading a chloroethylene compound comprising inducing microorganisms capable of degrading the chloroethylene compound by an aromatic degradative catechol ring fission pathway by incubating said microorganisms an aromatic compound capable in inducing said pathway, and incubating said induced microorganisms together with said chloroethylene compound,

whereby said chloroethylene compound is degraded by said aromatic degradative catecol ring fission pathway.

4,959,316

PROCESS FOR AMPLIFYING THE EXPRESSION OF A SPECIFIC GENE IN BACILLUS SUBTILIS, AND STRAINS OBTAINED

Ehrlich Stanislas, Paris; Jeanniere Laurent, Vitry sur Seine; Pierre Evelyne, Etrechy, and Brigitte Niaudet, Paris, all of France, assignors to Centre National de la Recherche Scientifique (CNRS), Paris, France

Continuation of Ser. No. 677,999, Dec. 4, 1984, abandoned. This application Dec. 18, 1987, Ser. No. 135,515

Claims priority, application France, Apr. 27, 1984, 84 6701

Int. Cl.[5] C12N *15/00, 1/00, 1/20;* C12P *21/00*

U.S. Cl. 435—172.3 22 Claims

1. Process for preparing a strain of Bacillus, in the chromosome of which a specific gene has been amplified, said process comprising:

(a) integrating at least one plasmid integration vector bearing said specific gene into the Bacillus chromosome, said chromosome now comprising:

(1) at least one heterologous DNA sequence which is an amplifiable unit, which comprises said specific gene, the expression elements of said gene and two identical sequences, wherein said sequences are tandemly duplicated; and

(2) an amplifiable unit which also codes for a selectable gene; and

(b) selecting by culturing the strains of Bacillus obtained on a selection medium corresponding to the selectable gene; and

(c) isolating the strains which have the phenotype corresponding to the presence of an increased number of copies of said specific gene relative to the bacterial population before selection step (b).

4,959,317

SITE-SPECIFIC RECOMBINATION OF DNA IN EUKARYOTIC CELLS

Brian L. Sauer, Greenville, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 784,951, Oct. 7, 1985. This application Apr. 29, 1987, Ser. No. 43,795

Int. Cl.[5] C12P *21/00, 19/34;* C12N *15/00, 5/00*

U.S. Cl. 435—172.3 40 Claims

1. A method for producing site-specific recombination of DNA in eukaryotic cells, comprising,

(a) introducing into the cells a first DNA sequence comprising a first lox site and a second DNA sequence comprising a second lox site, and

(b) contacting the lox sites with Cre, thereby producing the site specific recombination.

4,959,318

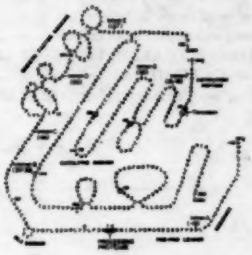
EXPRESSION OF PROTEIN C

Donald C. Foster; Mark J. Murray, and Kathleen L. Berkner, Seattle, Wash., assignors to ZymoGenetics, Inc., Seattle, Wash.

Continuation-in-part of Ser. No. 749,600, Jun. 27, 1985. This application Oct. 29, 1986, Ser. No. 924,462

Int. Cl.[5] C12N *15/00, 9/64, 5/02;* C07H *15/12*

U.S. Cl. 435—69.1 20 Claims



1. A DNA sequence which codes for a protein having substantially the same biological activity as human protein C or human activated protein C, said sequence further coding for the pre-pro peptide of factor VII.

4,959,319

PROCESS OF CORNEAL ENHANCEMENT

Debra L. Skelnik, Box 344, Rte. 5, Cambridge, Minn. 55008, and Richard L. Lindstrom, 1065 W. Ferndale Rd., Wayzata, Minn. 55391

Continuation of Ser. No. 761,405, Aug. 1, 1985, abandoned. This application Feb. 17, 1989, Ser. No. 311,846

Int. Cl.[5] C12N *5/08, 5/00;* A01N *1/02*

U.S. Cl. 435—240.2 1 Claim

1. A process for enhancing an intact endothelial monolayer of a human donor cornea to be used in penetrating keratoplasty, the method comprising:

a. enzymatically isolating corneal endothelial cells from a human donor cornea;

b. optionally, one of:

1. in a suitable medium, establishing a primary line of cells isolated in (a), proliferating them and then maintaining them, or,

2. storing the cells isolated in (a) at a temperature of about −80° C.; and then,

c. seeding an enzymatically treated intact endothelial monolayer of a donor cornea with the cells prepared in (a) or (b)(1) or the thawed cells of (b)(2).

4,959,320

MONOCLONAL ANTIBODY, PROCESS FOR PREPARING SAME, REAGENT FOR DETECTING CANCER ANTIGEN CONTAINING THE MONOCLONAL ANTIBODY AND PROCESS FOR PREPARING SAME

Yahiro Uemura, Osaka; Kazumi Fukuyama, Kyoto; Takashi Kobayashi, Hyogo; Yoshiaki Kanou, Osaka; Ryutaro Yamana, Osaka; Eiji Kashiwagi, Osaka; Tomokuni Taniguchi, Osaka; Kazuaki Nakura, Osaka; Masahiro Watanabe, Hyogo; Masayuki Nishida, and Tadakazu Suyama, both of Kyoto, all of Japan, assignors to Green Cross Corporation, Osaka, Japan

Filed Aug. 8, 1985, Ser. No. 763,587

Claims priority, application Japan, Aug. 8, 1984, 59-166980

Int. Cl.[5] C12N *5/00, 15/00;* C12P *21/00*

U.S. Cl. 435—240.27 6 Claims

1. A monoclonal antibody having a binding specificity for pancreas cancer-associated antigen, intestinum crassum can-

cer-associated antigen and hepatoma-associated antigen wherein said cancer-associated antigen has the following characteristics:

(1) it exists in a blood serum of pancreas cancer, intestinum crassum cancer and hepatoma patients;

(2) it is glycoproteins;

(3) it has a molecular weight of about 700,000 to 1,500,000, as measured by gel-filtration and determined by comparison with that of a known protein;

(4) it has a maximum absorption of 280 nm when dissolved in 0.1M acetic acid buffer solution (pH 4.5);

(5) it is released in a supernatant of culture medium of established cell line of COLO-201, TE-1, TE-2, TE-3, NRC-12, MKN-45 or KATO III; and

(6) it is not released from a lung-derived established cancer cell line.

4,959,321

CELL FUSION APPARATUS

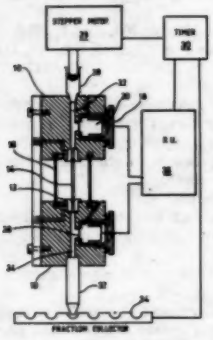
Alan W. Preece, Radiotherapy Centre, Horfield Road, Bristol, BS2 8ED, United Kingdom, and Douglas H. Follett, Bristol General Hospital, Guinea Street, Bristol, BS1 6SP, United Kingdom

Filed Mar. 13, 1989, Ser. No. 322,349

Claims priority, application United Kingdom, Mar. 26, 1988, 8807271

Int. Cl.[5] C12M *1/38, 3/00*; B01D *61/42*

U.S. Cl. 435—284 **8 Claims**



1. Apparatus for the electrofusion of cells comprising a flow channel of specific flow capacity for passage of cells suspended in a medium, the flow channel being mounted between end blocks containing inlet/outlet passages communicating with said flow channel, said inlet/outlet passages connecting at one end block with a syringe adapted to be driven by a stepper motor for producing a pulsed flow of the medium and at the other end with an outlet tip for feeding samples into a fraction collector, respectively, cooling means surrounding the flow channel, an electrode at each end of the flow channel, the electrodes being accommodated in electrolyte contained in electrolyte chambers formed in the respective end blocks, the electrolyte being separated from the inlet/outlet passages in the end blocks by semipermeable membranes, and a high voltage pulse generating circuit for applying DC voltage pulses to the electrodes while the medium is caused to flow slowly through the flow channel.

4,959,322

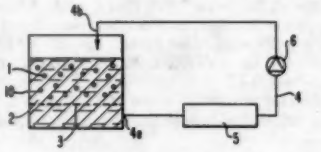
CULTURING APPARATUS

Mari Sakai, Tokyo, Japan, assignor to W. L. Gore & Associates, Inc., Newark, Del.

Filed Mar. 7, 1989, Ser. No. 320,147

Int. Cl.[5] C12M *1/12*

U.S. Cl. 435—311 **1 Claim**



1. A culturing apparatus in which a gas is caused to contact a culture solution via a gas-permeable membrane so that said gas is supplied to said culture solution, comprising:

(a) gas-permeable membrane module which surrounds a gas-permeable membrane tube which allows gas to pass through without allowing culture solution to pass through, and the aforementioned gas-permeable membrane module is divided by a partition, with the pressure on one side of the partition lowered so that product gasses are removed from the culture solution, and the pressure on the other side of the partition is raised so that gas is supplied to the culture solution and

(b) a culture solution supply means, which supplies culture solution to the aforementioned gas-permeable membrane from a supply source.

4,959,323

PRODUCTION AND USE OF PRE S POLYPEPTIDES OF HEPATITIS B VIRUS

George Acs, Manhasset, N.Y.; Judith K. Christman, Wyckoff, N.J.; Peter Price, New York, N.Y.; Wolf Offensperger, Bad Durkheim, Fed. Rep. of Germany, and Silke Wahl, Buehl, Fed. Rep. of Germany, assignors to Mt. Sinai School of Medicine of the City University of New York, New York, N.Y.

Filed Nov. 4, 1985, Ser. No. 794,504

Int. Cl.[5] C12N *15/63, 15/70*

U.S. Cl. 435—320 **10 Claims**

1. A recombinant plasmid comprising a lacZ gene and a DNA sequence encoding a preS polypeptide, a preS2 polypeptide or both of hepatitis B virus envelope protein wherein the polypeptide sequence is inserted within the lacZ gene.

4,959,324

SAMPLE PAD ASSAY INITIATION DEVICE AND METHOD OF MAKING

Urs A. Ramel, Portola Valley; Michael P. Allen, Sunnyvale, and Prithipal Singh, Los Alto Hills, all of Calif., assignors to ChemTrak, Inc., Sunnyvale, Calif.

Continuation-in-part of Ser. No. 324,407, Mar. 16, 1989, which is a continuation-in-part of Ser. No. 195,881, May 19, 1988, and Ser. No. 64,883, Jun. 22, 1987. This application May 18, 1989, Ser. No. 353,910

Int. Cl.[5] G01N *21/79, 31/22*; C12Q *1/54, 1/60*

U.S. Cl. 436—169 **19 Claims**

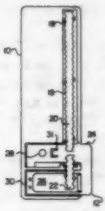
1. An analyte measuring device which cooperates with a signal producing system for producing a detectable signal in a detection zone, said device comprising:

a housing comprising a well adjacent to one end of said housing, a flow path for holding in position two bibulous strips spaced apart in tandem relationship to define a space, and proximal to said well an space for receiving a slide mechanism;

an orifice for receiving a sample displaced from and substan-

tially aligned with the space between said two bibulous strips;

a slide element in said interspace comprising: (1) a sample receiving element positioned (i.) under said orifice when said slide element is in a first position, and (ii.) positioned in said space, when said slide is in a second position; and means for releasing a liquid into said well when said slide



is moved from said first position to said second position; and

first and second bibulous strips in said flow path, said first strip extending from said well to said space to transport liquid from said well to said sample receiving element and said second strip comprising said detection zone and extending from said space toward the end opposite from said well.

4,959,325

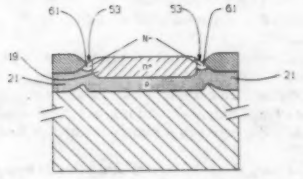
REDUCTION OF ELECTRIC FIELD EFFECT IN THE BIRD'S BEAK REGION OF A DRAM CELL FOLLOWING EXPANSION OF ACTIVE REGION THROUGH LOCAL ENCROACHMENT REDUCTION

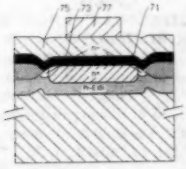
Ruojia R. Lee, and D. M. Durcan, both of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.

Filed Feb. 24, 1989, Ser. No. 316,135

Int. Cl.[5] H01L *21/425, 29/96*

U.S. Cl. 437—30 **7 Claims**





1. A process for reducing the electric field effect in the bird's beak region of a DRAM cell following expansion of the cell's active area, which had previously been implanted with arsenic to create N+ regions, through local encroachment reduction, said process comprising the step of blanket implanting the active are with phosphorus to create N— regions between the N+ regions and the edge of the field oxide.

4,959,326

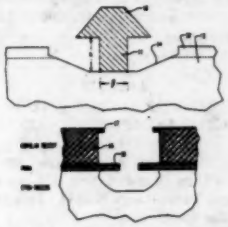
FABRICATING T-GATE MESFETS EMPLOYING DOUBLE EXPOSURE, DOUBLE DEVELOP TECHNIQUES

Bernard J. Roman, Summit, N.J., and Richard E. Muller, Pasadena, Calif., assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 22, 1988, Ser. No. 289,071

Int. Cl.[5] H01L *21/338*

U.S. Cl. 437—40 **20 Claims**



1. A method for fabricating a T-gate FET structure, comprising the steps of:

applying a layer of PMMA to the top surface of a GaAs wafer,

forming a gate pattern on said layer of PMMA,

first developing said gate pattern as formed on said wafer,

coating said developed wafer with a second layer of resist of a thicker dimension than said layer of PMMA and not reactive with said PMMA layer,

forming said gate pattern on said second layer of resist,

second developing said gate pattern on said second layer to form a composite T-gate configuration pattern,

etching said wafer to form a T-gate recess in said wafer, and

depositing a gate structure on said wafer to form a T-gate FET.

4,959,327

VECTORS AND METHOD OF *PENICILLIUM CHRYSOGENUM* TRANSFORMATION

Florentina S. Sanchez; Victor R. Susan; Miguel A. P. Soto, and Agustin P. A. Ortega, all of Madrid, Spain, assignors to Antibiotics, S.A., Madrid, Spain

Filed Feb. 2, 1987, Ser. No. 9,713

Claims priority, application United Kingdom, Jan. 31, 1986, 8602479; Mar. 26, 1986, 8607502; Jun. 27, 1986, 8615798

Int. Cl.[5] C12N *1/13, 15/01, 15/52, 15/11*

U.S. Cl. 435—172.3 **11 Claims**

1. A method of preparing transformed *penicillium chrysogenum* comprising:

(a) identifying a *P. chrysogenum* trp⁻ auxotrophic mutant having identifying characteristics of ATCC deposited cell

line accession number #10003 that is deficient in a tryptophan biosynthetic enzyme;

(b) transforming the identified *P. chrysogenum* mutant with an exogenous DNA segment which comprises a *P. chrysogenum* trpC gene marker and encodes the tryptophan biosynthetic enzyme which will complement said enzyme deficiency in said mutant to produce a transformed phototrophic *P. chrysogenum;* and

(c) selecting for the transformed phototrophic *P. chrysogenum* on culture medium lacking the nutrient required by the mutant auxotrophic *P. chrysogenum;* wherein transformed *P. chrysogenum* auxotrophic mutants exhibit restored phototrophy.

4,959,328

METHOD FOR MANUFACTURING A SEMICONDUCTOR COMPONENT CONTACTABLE ON BOTH SIDES

Wolfgang Behr, Thalfingen; Johann-Friedrich Luy, and Karl Strohm, both of Ulm, all of Fed. Rep. of Germany, assignors to Licentia Patent-Verwaltungs-GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed May 27, 1988, Ser. No. 199,922

Claims priority, application Fed. Rep. of Germany, Jun. 4, 1987, 3718683

Int. Cl.[5] **H01L** *21/20, 21/329*

U.S. Cl. 437—86 **7 Claims**

1. A method of manufacturing a semiconductor component which is contacted on both sides comprising the steps of:

providing a silicon substrate;

epitaxially growing a sequence of differently doped silicon semiconductor layers, corresponding to the layer sequence of the semiconductor component, on a surface of said substrate with the first silicon semiconductor layer of said sequence directly grown on said surface of said substrate being a p^+-doped silicon layer which is doped with boron, of a concentration in excess of 7×10^{19} cm^{-3}, and germanium of a concentration sufficient to compensate for mechanical stresses generated by the boron;

removing said substrate by etching;

contacting said first layer; and,

contacting the last layer of said sequence of layers.

4,959,329

SEMICONDUCTOR DEVICE

Tatsuo Okamoto, and Akihiko Ohsaki, both of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 174,498, Mar. 28, 1988, Pat. No. 4,887,143. This application Oct. 24, 1989, Ser. No. 425,926

Int. Cl.[5] **H01L** *21/44, 21/48*

U.S. Cl. 437—187 **3 Claims**

1. A method of manufacturing a semiconductor device, said method comprising:

a first step of forming a second semiconductor layer of second conductivity type on a first semiconductor layer of first conductivity type;

a second step of forming a first insulating layer on said second semiconductor layer;

a third step of forming a mask having an opening at a specified position on said first insulating layer;

a fourth step of utilizing said mask to implant oxygen ions or nitrogen ions through said first insulating layer into a region closed to a boundary of said first and second semiconductor layers, thereby forming a second insulating layer;

a fifth step of utilizing said mask to remove by etching a portion of said first insulating layer which corresponds to said opening of said mask so that a surface of said second semiconductor layer is exposed, thereby forming a contact hole; and

a six step of removing said mask, then and thereafter forming a conductive layer on said first insulating layer so that the conductive layer is electrically connected to said second semiconductor layer through said contact hole.

4,959,330

CRYSTALLIZABLE GLASS AND THICK FILM COMPOSITIONS THEREOF

Paul C. Donohue, Wilmington, Del.; Kenneth W. Haag, West Chester, Pa., and Michael J. Haun, Wilmington, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 368,843, Jun. 20, 1989, abandoned, which is a continuation-in-part of Ser. No. 277,118, Nov. 29, 1988, abandoned. This application Nov. 17, 1989, Ser. No. 438,833

Int. Cl.[5] **C03C** *10/06, 3/085*

U.S. Cl. 501—8 **3 Claims**

1. A dielectric glass composition consisting essentially on a molar basis of 15–27% ZnO, 8–30% alkaline earth metal oxides selected from 7–21% BaO, 0–20% CaO, 0–12% SrO and mixtures thereof, 40–60% SiO_2, 3–14% Al_2O_3, 0–5% PbO and 0.5–5% of an oxide selected from ZrO_2, 0.5 to 2.5% P_2O_5 and mixtures thereof, the composition being crystallizable and non-reducing when fired at 850°–900° C.

4,959,331

ALUMINA-ZIRCONIA-SILICON CARBIDE-MAGNESIA CUTTING TOOLS

Pankaj K. Mehrotra, and Elizabeth R. Billman, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Nov. 3, 1988, Ser. No. 266,721

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.[5] **C04B** *35/56*

U.S. Cl. 501—89 **37 Claims**

1. A metalcutting insert comprising:

a rake face;

a flank face;

a cutting edge at a juncture of said rake face and said flank face;

said cutting insert having an alumina based ceramic composition consisting essentially of:

about 1.5 to 17.5 v/o silicon carbide whiskers;

about 5 to 17.5 v/o zirconia;

a residue of a magnesia addition added in the amount of about 0.03 to 3 v/o;

alumina forming essentially the remainder of said composition;

wherein said silicon carbide whiskers, said zirconia and said residue of said magnesia addition are substantially homogeneously dispersed in a matrix formed of said alumina; and

wherein at least about 4.0 v/o of said ceramic composition is tetragonal zirconia.

4,959,332

ALUMINA-ZIRCONIA-CARBIDE WHISKER REINFORCED CUTTING TOOLS

Pankaj K. Mehrotra, and Elizabeth R. Billman, both of Greensburg, Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Nov. 3, 1988, Ser. No. 266,719

The portion of the term of this patent subsequent to Sep. 25, 2007, has been disclaimed.

Int. Cl.[5] **C04B** *35/56*

U.S. Cl. 501—89 **64 Claims**

1. A metalcutting insert comprising:

a rake face;

a flank face;

a cutting edge at a juncture of said rake face and said flank face;

and said metalcutting insert having an alumina based ceramic composition consisting essentially of about 1.5 to 12.5 v/o silicon carbide whiskers, about 7.5 to 17.5 v/o

zirconia, wherein at least about 7 v/o of said composition is tetragonal zirconia, and wherein said silicon carbide whiskers and zirconia are dispersed in an aluminia based matrix.

4,959,333

NON-REDUCING DIELECTRIC CERAMIC COMPOSITION

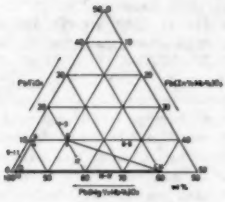
Yoshiaki Mori, Nagaokakyo; Hiroshi Takagi, Ohtsu; Masaru Fujino, Nagaokakyo, and Yukio Sakabe, Kyoto, all of Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Jul. 27, 1989, Ser. No. 386,790

Claims priority, application Japan, Jul. 28, 1988, 63-188696

Int. Cl.[5] C04B *35/46*

U.S. Cl. 501—136 **1 Claim**



1. A non-reducing dielectric ceramic composition consisting essentially of 60 to 99.5 wt % of a basic composition expressed by the general formula:

$$xPb(Mg_{1/6}Nb_{4/3})O_3—yPb(Zn_{1/3}Nb_{4/3})O_3—zPbTiO_3$$

where x, y and z are proportions by weight percentage of the three components, $Pb(Mg_{1/3}Nb_{4/3})O_3$, $Pb(Zn_{1/3}Nb_{4/3})O_3$ and $PbTiO_3$, and 0.05 to 40 wt % of an anti-reducing agent incorporated therein and expressed by the general formula:

$$aLi_2O—bRO—cB_2O_3+(1-a-b-c)SiO$$

where R is at least one element selected from the group consisting of Mg, Ca, Sr and Ba, a, b and c are molar fractions of the respective component and take values within the following respective ranges: $0 \leqq a < 0.2$, $0.1 \leqq b < 0.55$ $0 = c < 0.4$, said basic composition having a set of proportions, by weight percentage, of the three components, x, y and z, falling within the compositional area encompassed by the polygon ABCD defined by points, A, B, C, and D shown in FIG. 1, the sets of proportions, by weight percentage, of the three components at said points being as follows:

x	y	z
89.0	1.0	10.0
80.0	10.0	10.0
59.5	40.0	0.5
98.5	1.0	0.5.

4,959,334

FLUIDIZED-BED CATALYST REGENERATION

Jean-Louis Mauleon, Marly-Le-Roy, and Jean-Bernard Sigaud, Vaucresson, both of France, assignors to C. Compagnie de Raffinage et de Distribution, Levallois-Perret, France

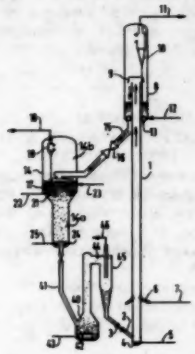
Filed Dec. 21, 1988, Ser. No. 287,500

Claims priority, application France, Dec. 21, 1987, 87 17822

Int. Cl.[5] B01J *38/34, 38/36, 29/38;* C10G *11/18*

U.S. Cl. 502—43 **12 Claims**

1. A process for the regeneration of catalyst particles by combustion of coke deposited thereon during a hydrocarbon conversion reaction to which process more than 50 percent of the coke is burned in at least one regeneration chamber operating with a fluidized bed of said particles, said process comprising carrying out the combustion of the coke at a temperature which does not exceed 750° C. in a fluidized bed having an upper dense portion and a lower ebullating portion, in which the spent catalyst coming from the hydrocarbon conversion reaction is dispersed above the surface or in the upper part of the upper dense portion and the catalyst particles move essentially from top to bottom countercurrent to an oxygen-containing gas which functions as a fluidizing medium whose rising superficial velocity in the ebullating lower portion at the base of the fluidized bed ranges from 1.2 to 3.5 meters/second to maintain in the effluent gases from said chamber a CO/CO_2



ratio of from 0.5 to 1.5, recovering the at least partially regenerated catalyst particles from the lower portion of the fluidized bed and slowing down the fluidizing medium in the suspension of catalyst particles now essentially devoid of available oxygen in the resulting upper dense portion of the fluidized bed by substantially increasing the diameter of the zone of the regeneration chamber defining the upper dense portion so that the superficial velocity of the rising fluidizing medium which no longer contains any oxygen is reduced to a value between 0.2 and 1.5 meters/second which corresponds to the conditions needed for maintaining fluidization in a dense fluidized bed and wherein the ratio of diameters between an upper portion and a lower portion of the fluidized bed ranges from 1.25 to 3.00.

4,959,335

PROCESS FOR THE PREPARATION OF CLAY LOADED METAL COMPLEXES CATALYST AND A PROCESS FOR THE HYDROGENATION OF OILS USING THE CATALYST SO PREPARED

M. M. Taqui Khan, and M. R. Hussain Siddiqui, both of Bhavnagar, India, assignors to Council of Scientific & Industrial Research, New Delhi, India

Continuation of Ser. No. 114,118, Oct. 27, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,484

Int. Cl.[5] B01J *31/22, 31/24*

U.S. Cl. 502—62 **4 Claims**

1. A process for the preparation of clay loaded metal complex hydrogenation catalyst which comprises refluxing a platinum group metal complex of the formula MX_n, wherein M is a platinum group metal, X is a halide and n is 1, 2, 3 or 4 with sigma-donor substituted phosphines or arsine ligand and clay in the presence of an organic solvent, precipitating the solution, drying under vacuum and, if required, re-precipitating for purification.

4,959,336

SILICATE-MODIFIED MAGNESIUM ETHOXIDE POLYMERIZATION CATALYSTS

Robert C. Job, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed Apr. 7, 1989, Ser. No. 334,407

The portion of the term of this patent subsequent to Oct. 17, 2006, has been disclaimed.

Int. Cl.[5] B01J 31/14; C08F 4/654

U.S. Cl. 502—107 6 Claims

1. A process for improving the productivity and morphology of a polymerization catalyst formed from a magnesium ethoxide, which comprises treating said magnesium ethoxide with a silane of the formula $R_mSi(OR')_{4-m}$ where $R=C_nH_{2n+1}$, $n\geq 2$, $0\leq m<4$ and R' may be an aryl or alkyl, at or above the temperature at which any alcohol which may be bound to the magnesium ethoxide would dissociate from the ethoxide prior to subjecting said magnesium ethoxide to metathesis.

4,959,337

WAX ISOMERIZATION CATALYST AND METHOD FOR ITS PRODUCTION

Ian A. Cody, Clearwater, Canada; Hamner, deceased Glen P., late of Baton Rouge, La. (by Annabelle Hamner, executor); Willard H. Sawyer, Baton Rouge, La.; Willard H. Sawyer, Baton Rouge, La., and Davis S. Mark, Baton Rouge, La., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation-in-part of Ser. No. 134,795, Dec. 18, 1987, abandoned. This application Dec. 13, 1988, Ser. No. 283,709

Int. Cl.[5] B01J 21/04, 27/12, 27/13

U.S. Cl. 502—230 20 Claims

1. A wax isomerization catalyst comprising a Group VIII hydrogenation metal component on a fluorided alumina or material containing alumina support, which catalyst is characterized by possessing a surface nitrogen content N/Al ratio as determined by X-ray photoelectron spectroscopy of about 0.01 N/Al or less, a bulk fluorine content of between about 2 to 10 wt%, a surface fluorine content, defined as the amount of fluorine present in the layer between the outer surface of the particle and extending about 1/100 of an inch in from the surface, of less than about 3 wt% provided that the surface fluoride concentration is less than the bulk fluoride concentration and an aluminum fluoride hydroxide hydrate peak height of 60 or less determined as the relative amount of hydrate represented by a peak in the X-ray diffraction (XRD) pattern at $2\theta=5.66$ Å when a hydrate level of 100 corresponds to the XRD peak height exhibited by a standard material which standard material is a platinum on fluorided alumina containing 0.6 wt% Pt on 150 m^2/g surface area alumina fluorided using an aqueous solution containing a high concentration of HF to deposit 7.2 wt% fluorine on catalyst and dried at 150° C. for 16 hrs.

4,959,338

HEAT-RESISTANT CATALYST CARRIER MOLDINGS AND CATALYSTS FOR COMBUSTION

Tadashi Miura; Takuji Itoh; Masaaki Kadono, and Masakichi Shimada, all of Ooi, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 30, 1988, Ser. No. 278,138

Claims priority, application Japan, Aug. 17, 1988, 63-204124; Sep. 10, 1988, 63-227277; Sep. 12, 1988, 63-227675

Int. Cl.[5] B01J 21/12

U.S. Cl. 502—263 14 Claims

4. A catalyst for combustion, comprising a substrate comprising:

a heat-resistant catalyst carrier molding comprising an inorganic oxide which comprises silica and alumina having a silica content in the range of 2% by weight to 30% by weight, an overall pore volume of at least 0.3 ml/g, a volume of pores of 100 Å or larger of at least 60% with respect to said overall pore volume, as determined by the measurement of a pore distribution according to the nitrogen absorption method, and an NMR spectrum having a peak area at −50 ppm to −130 ppm of which 0 to 10% is with respect to a peak area at −100 ppm to −130 ppm, as measured by the nuclear magnetic resonance (^{29}Si-NMR) method using silicone rubber (−21.9) as a reference peak after firing at 500° C. in air;

a layer comprising said inorganic oxide formed on said substrate; and

a catalytically active metal component.

4,959,339

HEAT-RESISTANT NOBLE METAL CATALYST AND METHOD OF PRODUCING THE SAME

Hiromichi Arai, Fukuoka, Japan, assignor to Catalysts and Chemicals Inc., Tokyo, Japan

Filed Apr. 11, 1989, Ser. No. 336,218

Claims priority, application Japan, Apr. 13, 1988, 63-88910

Int. Cl.[5] B01J 21/04, 23/10, 23/58, 23/64

U.S. Cl. 502—302 14 Claims

1. A heat-resistant noble metal catalyst consisting essentially of a composition having a formula $A_{1-z}C_zB_xD_yAl_{12-y-z}O_{19-\alpha}$, wherein A is at least one element selected from the group consisting of Ba, Ca and Sr, C is at least one element selected from the group consisting of K, Rb and rare earth elements, B is at least one element selected from the group consisting of Mn, Co, Fe, Ni, Cu and Cr, D is at least one element selected from the group consisting of Au, Ag and platinum group noble metals, z is a value in a range of 0–about 0.4, x is a value in a range of 0–about 4, y is a value in a range of x–2x, u is a value of not less than about 0.01, x+u is a value of not more than about 4, and α is a value which is determined by the valences X, Y, Z and U of the respective element A, C, B and D and the values of x, y, z and u and is expressed as

$$\alpha=1-\tfrac{1}{2}\{X-z(X-Y)+xZ+uU-3y-3u\}.$$

4,959,340

METHOD OF MAKING LIQUID CHROMATOGRAPHY PACKING MATERIALS

Dwight E. Williams, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 212,192, Jun. 27, 1988, Pat. No. 4,897,197, which is a division of Ser. No. 63,147, Jun. 17, 1987, Pat. No. 4,773,994. This application Apr. 10, 1989, Ser. No. 335,588

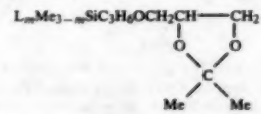
Int. Cl.[5] B01J 20/22, 20/10

U.S. Cl. 502—401 10 Claims

1. A method for making a packing material for liquid chromatography columns which comprises:

(a) providing a hydroxyl-bearing porous support selected from the group consisting of porous metalloid oxides, porous metallic oxides and porous mixed metallic oxides, and

(b) contacting said porous support with a ketal silane having the formula:



wherein L is chloro, a substituted amino or N-methylacetamido, Me is methyl, and m is 1–3, in sufficient amounts and for a sufficient period of time to form ketal blocked diol groups on the surfaces of said porous support.

2. The method of claim 1 wherein said porous support is porous silica containing silanol groups.

4. The method of claim 2 further including the step of contacting said porous silica with an excess of a trimethylsilyl end-capping reagent to cap remaining silanols on the surfaces of said porous silica.

4,959,341

BIODEGRADABLE SUPERABSORBING SPONGE

Donald F. H. Wallach, Brookline, Mass., assignor to Micro Vesicular Systems, Inc., Nashua, N.H.

Filed Mar. 9, 1989, Ser. No. 320,944
Int. Cl.[5] B01J *13/00, 20/22, 20/26*
U.S. Cl. 502—404 14 Claims

1. A composition of matter which acts as a synthetic sponge when allowed to hydrate comprising a non-hydrated mixture of:

a carboxylic acid with a substantial hydrophobic region;

a branched complex carbohydrate; and

a separate cross-linking agent;

whereby said composition can be hydrated and cross-linked simultaneously in the presence of a hydrating solution.

4,959,342

METHOD OF PRODUCING CATALYST CARRIERS

Motonobu Shibata, 18-86, Andon, Nakanosho-Cho, Inazawa City, Aichi Pref., Japan

Filed Dec. 22, 1988, Ser. No. 288,232
Claims priority, application Japan, Jun. 27, 1988, 63-156831
Int. Cl.[5] B01J *32/00*
U.S. Cl. 502—439 4 Claims

1. A method of producing a catalyst carrier, consisting essentially of the following steps:

preparing a metal strip from a stainless steel containing no aluminum;

plating surfaces of said metal strip with aluminum to a thickness of 1–10 μm;

rolling said aluminum-plated metal strip;

corrugating said rolled metal strip to form a porous body having gas permeability in at least one direction; and

simultaneously forming an aluminum-iron alloy layer, by reacting said plated aluminum with said stainless steel, and an alumina film on said rolled metal strip by oxidizing said plated aluminum through heat treating said porous body at 600° to 1000° C. in air for not less than 10 minutes.

4,959,343

CARBONLESS TRANSFER SHEETS FOR MULTI-PART FORMS PACKS

Philip M. Weinstein, 3240 W. Bruce Dr., Dresher, Pa. 19025

Continuation-in-part of Ser. No. 68,878, Jul. 1, 1987, Pat. No. 4,912,080, Continuation-in-part of Ser. No. 72,465, Jul. 13, 1987, abandoned. This application Jun. 17, 1988, Ser. No. 206,108
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.
Int. Cl.[5] B41M *5/22*
U.S. Cl. 503—200 20 Claims

1. A pressure sensitive carbonless transfer sheet, capable of image formation by light impact marking means in multi-part forms packs containing at least six of the sheets, comprising a paper sheet having a hot melt coating on at least one surface thereof, at least one of the coatings having a chromogenic material dispersed therein, wherein the paper sheet is characterized by a basis weight of 9–12 lbs of a ream of 500 sheets of paper each having dimensions of 17 by 22 inches, a thickness of 40–50 microns, a Gurley porosity of 400–4000 seconds, and a Bendsten smoothness of 90–260 ml/min on the wire side and 60–280 ml/min on the felt side.

4,959,344

METHOD OF MANUFACTURING SUPERCONDUCTIVE COIL BY EXPLOSIVE COMPACTION

Sadaaki Hagino; Motokazu Suzuki; Takuo Takeshita, all of Ohmiya; Hideki Tonda, and Kazuki Takashima, both of Kumamoto, all of Japan, assignors to Mitsubishi Metal Corporation, Tokyo, Japan

Filed Jun. 29, 1989, Ser. No. 373,943
Claims priority, application Japan, Jul. 4, 1988, 63-166366; Jul. 4, 1988, 63-166367
Int. Cl.[5] H01L *39/12, 5/08, 39/24*
U.S. Cl. 505—1 18 Claims

1. In a method of manufacturing a superconductive coil by means of explosive compaction by forming into a coil a tubular wire formed of silver having a superconductive oxide powder charged therein, subjecting said coil to explosive compaction to densify said coil, and heat-treating said coil thus densified in an air or oxygen atmosphere,

the improvement comprising the steps of:

(1) placing said coil within a cylindrical vessel and charging a pressure medium comprising a non-compacting powder which is not solidified by said explosive compaction or a fluid, into said cylindrical vessel; and

(2) carrying out said explosive compaction to cause compaction of said coil by the action of a shock wave traveling through said cylindrical vessel and said pressure medium and hence densify said coil.

4,959,345

METHOD OF ADDING OXYGEN INTO OXIDE SUPERCONDUCTING MATERIALS BY ION INJECTION

Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Hase Atsugi, Japan

Filed Apr. 27, 1988, Ser. No. 187,044
Claims priority, application Japan, May 6, 1987, 62-111611
The portion of the term of this patent subsequent to Apr. 10, 2007, has been disclaimed.
Int. Cl.[5] B05D *5/12, 3/06*
U.S. Cl. 505—1 5 Claims

1. A method for manufacturing a superconducting device comprising the steps of:

depositing a passivation film on the surface of an oxide superconducting material to substantially prevent escape of oxygen from said surface; and then

adding oxygen through the passivation film into the oxide superconducting material by ion injection to compensate for any oxygen which may have escaped from the material so that the material will be superconducting throughout the bulk of the material.

4,959,346

COMPOSITE WITH Y-BA-CU-O SUPERCONDUCTIVE FILM

Antonio Mogro-Campero, and Larry G. Turner, both of Schenectady, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Division of Ser. No. 192,039, May 9, 1988, Pat. No. 4,882,312. This application May 22, 1989, Ser. No. 354,569

Int. Cl.[5] B32B *9/00*

U.S. Cl. 505—1 21 Claims

12. A composite consisting essentially of a crystalline superconductive film, a microscopically pore-free zirconium dioxide film and a substrate, said superconductive film having a composition represented by the formula $YBa_xCu_yO_z$, where x ranges from about 1.9 to about 2.1, where y ranges from about 2.9 to about 3.1, and where z ranges from about 6.9 to about 7.0, said superconductive film having a zero resistance transition temperature of at least about 38 K and a thickness at least sufficient to be continuous ranging from about 0.4 micron to about 0.5 micron, said substrate being selected from the group consisting of monocrystalline elemental silicon, polycrystalline elemental silicon, oxidized monocrystalline element silicon, oxidized polycrystalline elemental silicon, amorphous silicon dioxide, monocrystalline aluminum oxide and polycrystalline aluminum oxide, said zirconium dioxide film being intermediate said superconductive film and said substrate, said zirconium dioxide film having a thickness ranging from about 2000 Angstroms to about 4000 Angstroms.

4,959,347

FORMING HOMOGENEOUS PRECURSERS OF BI-SR-CA-CU VIA CARBOXYLATES IN THE PRESENCE OF OXIDIZING AGENTS

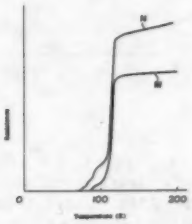
Toshio Kobayashi; Fusaoki Uchikawa, and Kenji Nomura, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 24, 1988, Ser. No. 235,497

Claims priority, application Japan, Aug. 24, 1987, 62-210940; Aug. 24, 1987, 62-210937; Mar. 31, 1988, 63-81715; Apr. 18, 1988, 62-96277

Int. Cl.[5] H01B *1/06;* H01L *39/06*

U.S. Cl. 505—1 12 Claims



1. A process for producing a superconductor of an oxide system containing metal elements in accordance with the formula:

$$Bi_1Sr_{0.5-3}Ca_{0.5-3}Cu_{0.5-3.5}$$

which process comprises:

(a) uniformly dissolving, dispersing or suspending metal elements for constituting the oxide system in a solvent at least partly in the form of carboxylates, and in the presence of an oxidizing agent selected from the group consisting of hydrogen peroxide, benzoyl peroxide, peracetic acid, perbenzoic acid, ozone and m-chloroperbenzoic acid; and

(b) removing the solvent to obtain a homogenous mixture, and sintering the mixture in an oxygen atmosphere.

4,959,348

Y-BA-CU-O SUPERCONDUCTOR FOR CONTAINING ANTIMONY OR BORON TO INCREASE CURRENT DENSITY

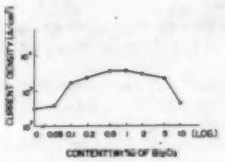
Kouji Higashibata, and Hironori Suzuki, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 9, 1988, Ser. No. 269,065

Claims priority, application Japan, Nov. 9, 1987, 62-281004; Dec. 16, 1987, 62-316160

Int. Cl.[5] C01F *17/00, 11/02;* C01G *3/02;* H01L *39/12*

U.S. Cl. 505—1 2 Claims



1. In a superconductor formed by sintering (Y_2O_3), BaO), and (CuO), the improvement comprising:

admixing prior to sintering an oxide of antimony or boron such that the superconductor resulting from said sintering contains from 0.1 to 5 wt.% antimony or boron as the oxide thereof.

4,959,349

INDANE DERIVATIVE AND PERFUMERY COMPOSITION COMPRISING THE SAME

Hiroaki Ohnuma, Ichikai; Yoshiaki Fujikura, Utsunomiya; Manabu Fujita, Kashiwa, and Nao Toi, Sakur, all of Japan, assignors to KAO Corporation, Tokyo, Japan

Filed Feb. 23, 1990, Ser. No. 483,881

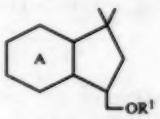
Claims priority, application Japan, Mar. 3, 1989, 1-51293; Mar. 3, 1989, 1-51292; Mar. 6, 1989, 1-53507

Int. Cl.[5] A61K *7/46*

U.S. Cl. 512—14 2 Claims

2. A perfumery composition comprising as its fragrance imparting component an indane derivative represented by formula (I),

(I)



wherein ring A is a benzene or cyclohexane ring and R^1 is a hydrogen atom, an alkyl group having 1–4 carbon atoms, or an alkanoyl group having 1–6 carbon atoms, provided that when ring A is benzene, R^1 is a group other than hydrogen atom.

4,959,350

ENTERAL DIET PRODUCT AND AGENT FOR PRODUCTION THEREOF

Sven Frokjaer, Naerum; Svend Eriksen, Allerod, and Jens L. Adler-Nissen, Hellerup, all of Denmark, assignors to Novo Industri A/S, Bagsvaerd, Denmark

Filed Apr. 15, 1987, Ser. No. 38,668

Claims priority, application Sweden, Apr. 21, 1986, 8601828

Int. Cl.[5] A23J *1/14;* A61K *37/18*

U.S. Cl. 514—2 11 Claims

1. In an enteral diet product comprising dietary nitrogen compounds, carbohydrate(s) and water and characterized by a pH lower than about 4.5 and an osmolality below about 350

milli-osmal, the improvement which comprises at least 50% of the dietary nitrogen compounds being a vegetable protein hydrolysate characterized by being at least 95% soluble in aqueous media pH 2-7 and by being non-bitter in the enteral diet product, said product further containing fat and a total energy content of at least about 0.68 k cal/ml.

4,959,351

CRYSTAL SUSPENSIONS OF INSULIN DERIVATIVES, PROCESSES FOR THEIR PREPARATION AND THEIR USE

Ulrich Grau, Hofheim am Taunus, Fed. Rep. of Germany, assignor to Hoescht Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

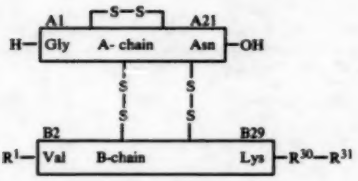
Filed Jul. 27, 1984, Ser. No. 635,257

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327709

Int. Cl.[5] A61K *37/26*

U.S. Cl. 514—4 **20 Claims**

1. A process for the preparation of a suspension of crystals of substantially uniform particle size and substantially uniform shape suitable for injection of at least one insulin derivative of the formula I



(I)

in which

R^1 denotes H or H-Phe,

R^{30} represents the radical of Ala, Thr or Ser and

R^{31} represents a physiologically acceptable organic group of basic character of the formula X_n-S which has up to 50 carbon atoms, in which n is 0, 1, 2 or 3

X represents identical or different radicals of naturally occurring basic L-amino acids or of the corresponding D-amino acids or both and

S denotes O-4 or a physiologically acceptable protective group which blocks the carboxyl group, but S being, if n is 0, a positively charged or protonatable basic radical and, if n is greater than 0, S can carry such a radical

and which contains or does not contain a terminal carboxyl function or an ester or an amide thereof, with an isoelectric point between 5.8 and 8.5, which comprises carrying out the crystallization in an aqueous medium closes to the isoelectric point of the derivative in the presence of at least one phenol and of glycerol as an isotonicity agent.

4,959,352

CYCLIC GROWTH HORMONE RELEASING FACTOR ANALOGS AND METHOD FOR THE MANUFACTURE THEREOF

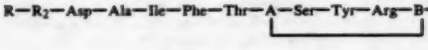
Arthur M. Felix, West Caldwell, and Edgar P. Heimer, Sparta, both of N.J., assignors to Hoffmann-la Roche Inc., Nutley, N.J.

Continuation of Ser. No. 98,340, Sep. 18, 1987, abandoned. This application Aug. 28, 1989, Ser. No. 399,123

Int. Cl.[5] A61K *37/02*; C07K *7/54*

U.S. Cl. 514—9 **14 Claims**

1. A cyclic peptide of the formula



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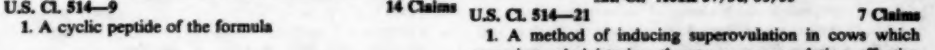


wherein

R=Tyr, desNHhd 2-Tyr, Ac-Tyr, His or N-Methyl-L-Tyr

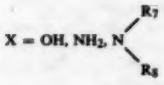
R_2=Ala, D-Ala or N-methyl-D-Ala

R_3=Gly, Ala, Leu, Val, Ile, Nle, NVal, β-Ala or "a-Aib"

R_4=Met, Leu, Nle or Ile

R_4=Ser or Asn

R_6=an amino acid sequence selected from the group consisting of Arg-Gln-Gln-Gly-Glu-Ser-Asn-Gln-Glu-Arg-Gly-Ala-Arg-Ala-Arg-Leu and fragments thereof where the fragment is reduced in number by 1 to 15 amino acids from the carboxyl end



where R_7 and R_8 are each independently lower alkyl

A=Asp, Glu, α-aminopimelic acid or a -aminoadipic acid

B=Lys, Orn, diaminopropionic acid, diaminobutyric acid or a pharmaceutically acceptable salt thereof; and the side chain carboxy terminus of A is bonded via an amide bond to the side chain amino terminus of B.

4,959,353

PROMOTION OF CORNEAL STROMA WOUND HEALING WITH HUMAN EPIDERMAL GROWTH FACTOR PREPARED FROM RECOMBINANT DNA

Gregory L. Brown, Atlanta, Ga.; Richard Elferman; Gregory L. Schultz, both of Louisville, Ky., and Valenzuela, Pablo D. T., San Francisco, Calif., assignors to University of Louisville Foundation, Louisville, Ky. and Chiron Corporation, Emeryville, Calif.

Continuation-in-part of Ser. No. 663,092, Oct. 19, 1984, abandoned. This application Apr. 23, 1987, Ser. No. 41,695

Int. Cl.[5] A61K *37/36*; C12P *21/02*

U.S. Cl. 514—12 **21 Claims**

1. A method for treating corneal stromal wounds to promote healing, said method comprising applying human epidermal growth factor (hEGF) to the wound, where said hEGF is produced by expressing an hEGF gene encoding a polypeptide having at least substantially the same amino acid sequence and the same corneal stromal wound-healing activity as naturally occurring human epidermal growth factor in a microorganism.

4,959,354

MIXTURES OF FSH AND LH FROM PIG HYPOPHYSES IN A DEFINITE RATIO

Manlio Barbetti, Rome, Italy, assignor to Istituto Farmacologico Serono S.p.A., Italy

Continuation of Ser. No. 834,141, Feb. 24, 1986, abandoned, which is a continuation of Ser. No. 578,517, Feb. 1, 1984, abandoned. This application Jul. 14, 1987, Ser. No. 73,901

Claims priority, application Italy, Feb. 11, 1983, 47699 A/83

Int. Cl.[5] A61K *37/36, 35/55*

U.S. Cl. 514—21 **7 Claims**

1. A method of inducing superovulation in cows which comprises administering thereto a superovulation effective amount of a gonadotropin composition comprising a mixture of porcine FSH and porcine LH in an IU ratio of between 0.5 and 2.5.

4,959,355

METHOD OF INHIBITING OSMOTIC WATER FLOW

Jorge Fischbarg, New York; Larry S. Liebovitch, Long Island City, and Jan P. Koniarek, Briarcliff Manor, all of N.Y., assignors to The Trustees of Columbia University in the City of New York, New York, N.Y.

Filed Mar. 16, 1987, Ser. No. 25,959
Int. Cl.[5] A61K 31/05, 31/40, 31/705, 31/70
U.S. Cl. 514—23 9 Claims

1. A method of inhibiting osmotic water flow across mammalian cell membranes which comprises contacting the water channels of the cell membranes with a glucose transport blocker so as to inhibit osmotic water flow across the membranes.

5. A method of inhibiting osmotic water flow across mammalian cell membranes which comprises contacting the water channels of the cell membranes with digitonin so as to inhibit osmotic water flow across the membranes.

7. A method of inhibiting osmotic water flow across mammalian cell membranes which comprises contacting the water channels of the cell membranes with escin so as to inhibit osmotic water flow across the membranes.

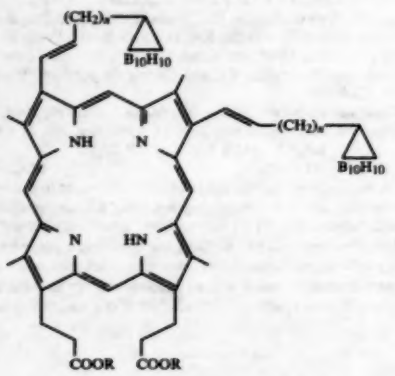
4,959,356

PORPHYRINS FOR BORON NEUTRON CAPTURE THERAPY

Michiko Miura, Center Moriches, N.Y., and Detlef Gabel, Bremen, Fed. Rep. of Germany, assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 26, 1989, Ser. No. 357,452
Int. Cl.[3] A61K 31/69; C07F 5/05
U.S. Cl. 514—64 12 Claims

1. A compound of the formula



wherein R is hydrogen or lower alkyl having 1 to 6 carbon atoms and n is 0 to 10.

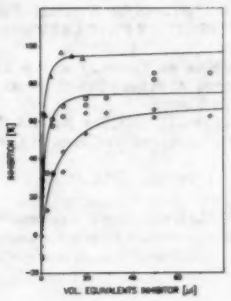
10. In a method of treating a patient with a malignant tumor which comprises administering to the patient a dose of a generally nontoxic compound which contains an element having an isotope that emits alpha particles when bombarded with neutrons, said compound being administered in a dosage sufficient to accumulate said isotope in the tumor in a concentration of at least 10 ppm; providing a source that emits neutrons having an energy distribution effective for neutron capture, said source having a port through which a beam of neutrons is emitted; and positioning the patient so that said tumor is in the path of said beam for a time sufficient to effect substantial tumor tissue deterioration; the improvement comprising using as the generally nontoxic compound a 3,8-(1,1'(2,2'-bis-(7,8-dicarbaundecaborate(-1)alkenyl) porphyrin derivative.

4,959,357

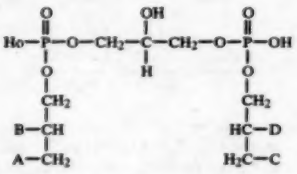
PHOSPHOLIPASE A2 INHIBITOR

Martin Reers, and Douglas R. Pfeiffer, both of Austin, Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Filed Aug. 23, 1985, Ser. No. 769,154
Int. Cl.[5] A61K 31/66; C07F 1/11
U.S. Cl. 514—103 8 Claims



1. A method for in vivo inhibition of phospholipase A_2 comprising administering to a mammal an effective amount of a compound of the formula;



wherein A is R_1CO_2 OH, B is R_2CO_2 or OH, D is R_3CO_2 or OH and C is R_4CO_2; wherein R_1, R_2, R_3 and R_4 are each C_{10}–C_{30} alkyl groups comprising from about 0–3 double bonds; and wherein at least A, B or D is OH.

4,959,358

DRUG ADMINISTRATION

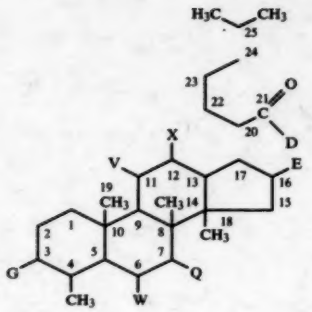
Martin C. Carey, Wellesley; Alan C. Moses, Waban, and Jeffrey S. Flier, West Newton, all of Mass., assignors to Beth Israel Hospital Assn. and The Brigham and Womens Hospital, Inc., Boston, Mass.

Continuation of Ser. No. 614,115, May 25, 1984, Pat. No. 4,746,508, which is a continuation-in-part of Ser. No. 501,187, Jun. 6, 1983, Pat. No. 4,548,922. This application May 23, 1988, Ser. No. 197,729
The portion of the term of this patent subsequent to Oct. 22, 2002, has been disclaimed.
Int. Cl.[5] A61K 31/56
U.S. Cl. 514—171 19 Claims

1. In a method of administering a drug which comprises applying to a human or animal mucosal surface for absorption across said mucosal surface

as an active ingredient, a biologically-effective amount of a drug specific for the disorder or condition

the improvement comprising applying the drug to the mucosal surface in admixture with a biocompatible, water-soluble, fusidic acid derivative having the formula:



wherein

a dashed line represents a single or a double bond;

D represents a group having a molecular weight below about 600 daltons which renders an effective amount of said steroid water-soluble within a range of about pH 2 to about pH 12;

E and G each represent OAc, OH, a lower alkyl group or a lower heteroalkyl group;

W represents OAc or H; and

Q, V and X each represent H or OH,

said steroid containing from two to three polar functions, exclusive of the function represented by D, which biocompatible, water-soluble, fusidic acid derivative acts as an adjuvant being capable of increasing drug permeability of a human or animal body surface across which the drug is to be administered, in an amount effective to increase the permeability of said surface to said drug.

4,959,359

PHENYL-THIAZEPINONES AS CALCIUM REGULATING AGENTS

Erno Mohacsi, Summit, and Jay P. O'Brien, Cedar Grove, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

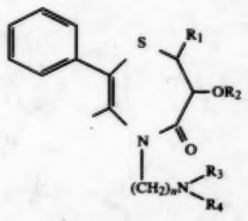
Filed Oct. 6, 1989, Ser. No. 418,369

Int. Cl.[5] C07D *281/06*; A61K *31/55*

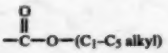
U.S. Cl. 514—211 **27 Claims**

1. A compound of the formula

I



wherein R_1 is phenyl substituted with 1 to 3 substituents selected from the group consisting of halogen and lower alkoxy; R_2 is hydrogen, lower alkyl, lower alkanoyl, lower cycloalkanoyl,



or

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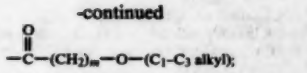
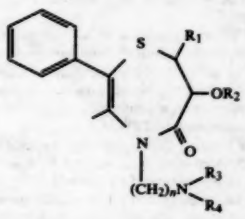


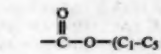
R_3 and R_4 are independently lower alkyl, phenyl lower alkyl or together form a piperidine or pyrrolidine ring; n is 2 to 4; n is 1 to 2; or a pharmaceutically acceptable acid addition salt thereof.

21. A method of inducing calcium channel blockage, which comprises administering to a warm-blooded animal in need of such treatment an effective amount of a compound of the formula

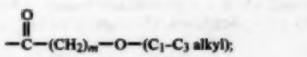
I



wherein R_1 is phenyl substituted with 1 to 3 substituents selected from the group consisting of halogen and lower alkoxy; R_2 is hydrogen, lower alkyl, lower alkanoyl, lower cycloalkanoyl,



or



R_3 and R_4 are independently lower alkyl, phenyl lower alkyl or together form a piperidine or pyrrolidine ring; n is 2 to 4; m is 1 to 2; or a pharmaceutically acceptable acid addition salt thereof.

4,959,360

α-ADRENERGIC RECEPTOR ANTAGONISTS

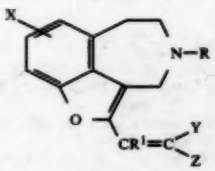
John J. Lafferty, Levittown; Robert M. Demarinis, Ardmore, and Joseph W. Venslavsky, Wayne, all of Pa., assignors to SmithKline Beecham Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 200,884, Jun. 1, 1988, abandoned. This application Jun. 6, 1989, Ser. No. 361,874

Int. Cl.[5] C07D *513/06*; A61K *31/38*

U.S. Cl. 514—217 **16 Claims**

1. A compound represented by the formula:



in which: X is H, Cl, Br, F, I, CF_3, C_{1-6}alkyl, COR^{10}, CO_2R^{10}, $CONR^{16}R^{11}$, CN, NO_2, $NR^{12}R^{13}$, OR^{12}, SC_{1-4}alkyl, $S(CH_2)_{0-6}$aryl, SCF_3, or any accessible combination thereof of up to three substituents;

R is H, C_{1-6}alkyl or C_{3-5}alkenyl;

R^1 is H or C_{1-6}alkyl;
R^{10} is C_{1-6}alkyl or $(CH_2)_{0-6}$aryl;
$R^{11}$and R^{16} independently are H, C_{1-6}alkyl, or $(CH_2)_{0-6}$aryl;
R^{12} is H, C_{1-6}alkyl, COR^{14}, or SO_2R^{15};
R^{13} is H or C_{1-6}alkyl;
R^{14} and R^{15} independently are C_{1-6}alkyl or $(CH_2)_{0-6}$aryl;
Y and Z independently are H, NO_2, C_{1-6}alkyl, CH_2CH_2OH, CN, CH_2ORhu 2, CH_2SR^2, COR^2, CO_2R^2, $CONR^3R^4$, $SO_2NR^3R^4$, SO_3R^2, SO_2R^5, SOR^5, $P(O)(OR^3)(OR^4)$, $P(O)R^5(OR^3)$, $P(O)R^5R^6$, $P(O)(OR^2)NR^3R^4$, $P(O)(NR^3R^4)_2$, $P(O)R^5(NR^3R^4)$, halo, CF_3, or $(CH_2)_{0-6}$aryl;
R^2, R^3, and R^4 independently are H, C_{1-6}alkyl, C_{3-5}alkenyl, or $(CH_2)_{0-6}$aryl; and
R^5 and R^6 independently are C_{1-6}alkyl, C_{3-5} alkenyl, or $(CH_2)_{0-6}$aryl; or a pharmaceutically acceptable salt thereof.

10. A method of antagonizing α-adrenergic receptors in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

13. A method of reducing blood pressure in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

14. A method of treating cardiovascular diseases in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

15. A method of treating benign prostatic hypertrophy in mammals that comprises administering to a subject in need thereof an effective amount of a compound of claim 1.

4,959,361

TRIAZOLO(4,3-a)(1,4)BENZODIAZEPINES AND THIENO (3,2-f)(1,2,4)TRIAZOLO(4,3-a)(1,4)DIAZEPINE COMPOUNDS WHICH HAVE USEFUL ACTIVITY AS PLATELET ACTIVATING FACTOR (PAF) ANTAGONISTS

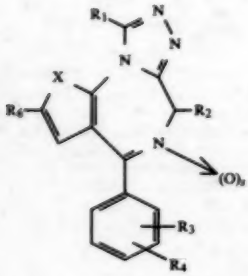
Armin Walser, West Caldwell, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Continuation-in-part of Ser. No. 227,948, Aug. 3, 1988, abandoned, which is a continuation-in-part of Ser. No. 134,726, Dec. 18, 1987, abandoned. This application Oct. 3, 1988, Ser. No. 252,964

Int. Cl.[5] **A61K** *31/55*; **C07D** *495/14*

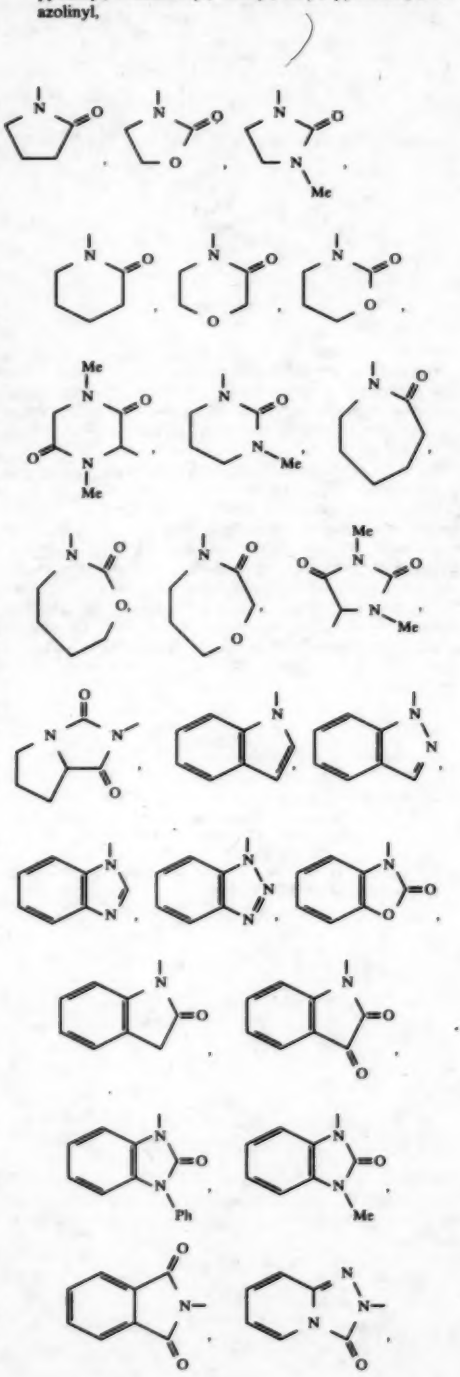
U.S. Cl. 514—220 **64 Claims**

1. A compound of formula



I

wherein X is —CH=CH— or S;
R_1 is lower alkyl, lower alkoxy or trifluoromethyl;
R_2 is hydrogen, lower alkyl, lower alkoxy, hydroxy or acetyloxy;
R_3 and R_4, independently, are hydrogen, chlorine, fluorine, lower alkyl or lower alkoxy;
s is an integer from 0 to 1, provided that when s is 1, R_2 cannot be hydroxy, lower alkoxy or acetyloxy;
R_5 is a radical of the formula
R_7—O—$(CH_2)_m$—C≡C— wherein R_6 and R_7 are naphthyl, phenyl or phenyl or naphthyl mono-, di- , or trisubstituted by chlorine, fluorine, lower alkoxy or lower alkoxy or a heterocyclic radical selected from the group consisting of pyridinyl, imidazolinyl, thienyl, furyl, pyrimidinyl, oxazolinyl,



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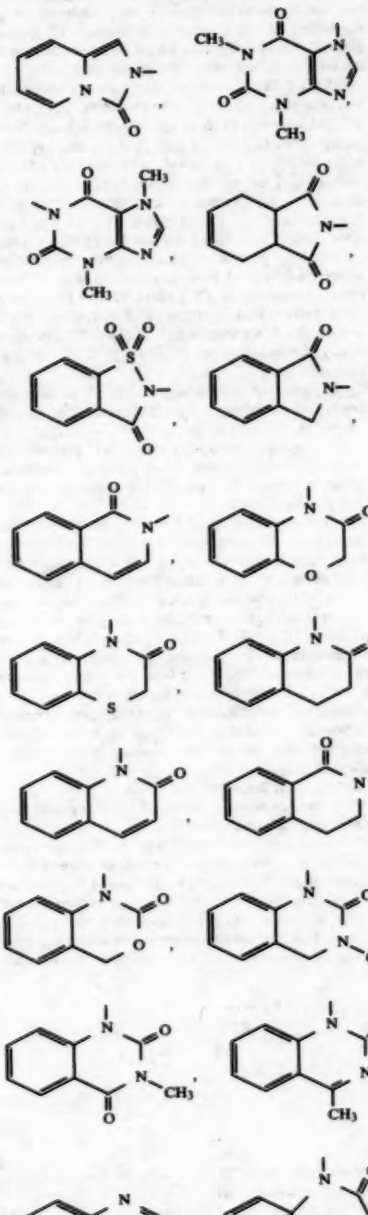

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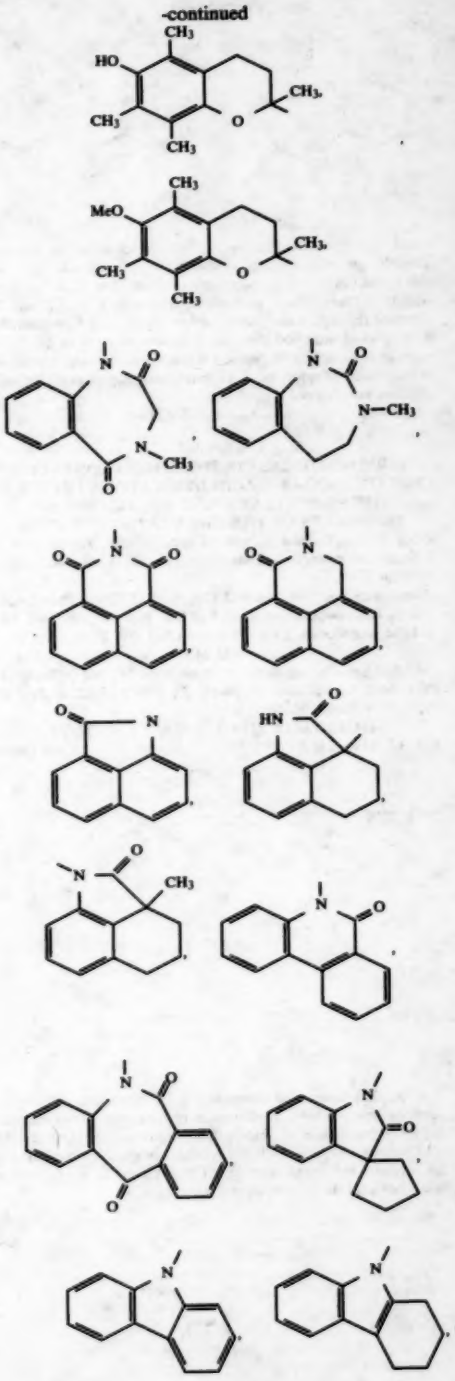

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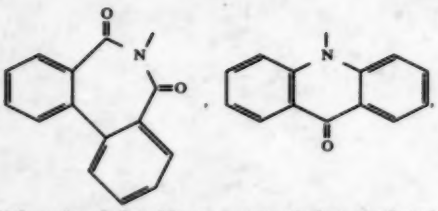


which can be substituted by one or two substitutents selected from the group consisting of lower alkyl, lower alkoxy, chlorine and fluorine, n is an integer of from 0 to 2 and m is an integer of from 1 to 2, provided that, when n is 0 R_6 must be attached through a carbon to carbon bond, and provided that R_7 is always attached through a carbon to oxygen bond, or, when at least one asymmetric carbon is present, an enantiomer or racemate thereof, or a pharmaceutically acceptable acid addition salt thereof.

4,959,362

PHARMACEUTICAL COMPOSITIONS CONTAINING CERTAIN ASCORBIC ACID DERIVATIVES USEFUL IN THE PROPHYLAXIS AND TREATMENT OF DISORDERS OF THE CIRCULATORY SYSTEM

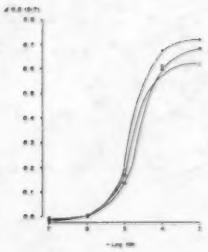
Shinji Terao, Toyonaka, and Minoru Hirata, Ikeda, both of Japan, assignors to Takeda Chemical Industries, Inc., Osaka, Japan

Continuation of Ser. No. 863,429, May 15, 1986, abandoned, which is a continuation-in-part of Ser. No. 683,136, Dec. 18, 1984, abandoned. This application Sep. 19, 1988, Ser. No. 245,943

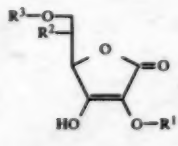
Claims priority, application Japan, Dec. 19, 1983, 58-240741; PCT Int'l Appl., May 17, 1985, PCT/JP85/00272; Jun. 18, 1985, PCT/JP85/00340

Int. Cl.[5] A61K *31/455, 31/535, 31/40, 31/34*

U.S. Cl. 514—231.5 **18 Claims**



1. A pharmaceutical composition for treatment of prophylaxis or improvement of disorders in functions of the circulatory system caused by biologically activated oxygen species and reactive organic radicals, which composition contains in an amount for administering 0.1 mg/kg to 50 mg/kg of an ascorbic acid derivative of the formula:



wherein

R^1 is of the formula $—CH_2—R$, wherein R is a C_{5-22} straight-chain or branched alkyl;

a C_{1-10} straight-chain or branched-chain alkyl group having one to three substituents selected from the group consisting of (1) C_{1-6} alkoxycarbonyl, (2) phenyl or naphthyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (3) benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (4) phenylcarbonyloxy or naphthylcarbonyloxy optionally substituted with one to three substitutents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (5) benzylcarbonyloxy or phenethylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (6) 2,3,5-trimethyl-1,4-benzoquinonyl, (7) 2,3-dimethoxy-5-methyl-1,4-benzoquinonyl and (8) 2-methyl-1,4-naphthoquinonyl;

a C_{2-20} alkenyl group having one to three substitutents selected from phenyl, naphthyl, benzyl or phenethyl, 3-pyridyl, thienyl and furyl;

a phenyl, naphthyl, benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, methoxy, methylenedioxy and hydroxyl;

a C_{1-9} acyl group selected from the group consisting of formyl, acetyl, propionyl, n-butyryl, isobutyryl, benzoyl, morpholino-carbonyl, C_{1-3} alkoxycarbonyl pyrrolidinocarbonyl, C_{1-3} alkoxycarbonyl, phenylcarbonyl or naphthylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy, benzylcarbonyl or phenethylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy;

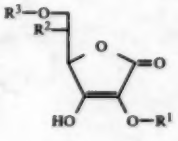
a phenyloxy, naphthyloxy, benzyloxy or phenethyloxy optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy;

R^2 is hydrogen or hydroxy; and

R^3 is hydrogen, or acyl,; or R^2 and R^3 may together form an O,O-isopropylidene residue;

or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier, vehicle or diluent therefor.

10. A method of treatment of prophylaxis or improvement of disorders in functions of the circulatory system caused by biologically activated oxygen species and reactive organic radicals, which comprises administering to a mammal an effective amount of an ascorbic acid derivative of the formula:



wherein

R^1 is of the formula $—CH_2—R$, wherein R is C_{5-22} straight-chain or branched alkyl;

a C_{1-10} stright-chain or branched-chain alkyl group having one to three substituents selected from the group consisting of (1) C_{1-6} alkoxycarbonyl, (2) phenyl or naphthyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl

and benzyloxy, (3) benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5}alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (4) phenylcarbonyloxy or naphthylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (5) benzylcarbonyloxy or phenethylcarbonyloxy optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, C_{1-3} alkoxy, halogen, nitro, amino, oxo, hydroxyl and benzyloxy, (6) 2,3,5-trimethyl-1,4-benzoquinonyl, (7) 2,3-dimethoxy-5-methyl-1,4-benzoquinonyl and (8) 2-methyl-1,4-naphthoquinonyl;

a C_{2-20} alkenyl group having one to three substituents selected from phenyl, naphthyl, benzyl, phenethyl, 3-pyridyl, thienyl and furyl;

a phenyl, napthyl, benzyl or phenethyl optionally substituted with one to three substituents selected from the group consisting of C_{1-5} alkyl, methoxy, methylenedioxy and hydroxyl;

a C_{1-9} acyl group selected from the group consisting of formyl, acetyl, propionyl, n-butyryl, isobutyryl, benzoyl, morpholino-carbonyl, C_{1-3} alkoxycarbonylpyrrolininocarbonyl, C_{1-3} alkoxycarbonyl, phenylcarbonyl or naphthylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy, benzylcarbonyl or phenethylcarbonyl optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy;

a phenyloxy, naphthyloxy, benzyloxy or phenethyloxy optionally substituted with one to three substituents selected from the group consisting of hydroxyl, C_{1-5} alkyl and C_{1-3} alkoxy;

R^2 is hydrogen or hydroxy; and

R^3 is hydrogen, or acyl; or R^2 and R^3 may together form an O,O-isopropylidene residue;

or a pharmaceutically acceptable salt thereof.

4,959,363

QUINOLONECARBOXAMIDE COMPOUNDS, THEIR PREPARATION AND USE AS ANTIVIRALS.

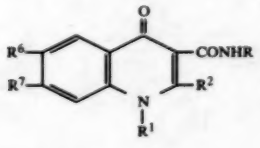
Mark P. Wentland, Colonie, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,926

Int. Cl.[5] **C07D** *215/233, 265/30;* **A61K** *31/47, 31/535*

U.S. Cl. 514—235.2 **12 Claims**

1. A compound of the formula



wherein

R is hydrogen, hydroxy, amino, lower-alkyl or $CH_2N{=}Z$, wherein N=Z is di-lower-alkylamino, 1-pyrrolidyl, 1-piperidinyl or 4-morpholinyl; R^1 is lower-alkyl, lower-alkenyl, cycloalkyl, pyridinyl, or phenyl or phenylmethyl where phenyl can be substituted by from one to three substituents selected from halo, lower-alkyl, lower-alkoxy and trifluoromethyl;

R_2 is hydrogen, amino or hydroxy;

R_6 is hydrogen or fluoro; and

R_7 is pyridinyl, pyridinyl substituted by one or two lower-alkyl groups, pyridinyl-N-oxide, phenyl, 5-isoxazolyl, 3-methyl-5-isoxazolyl or 3-methyl5-thiazolyl, with the proviso that when R is hydrogen or lower-alkyl, R^1 is lower-alkyl and R_7 is phenyl, R_2 is other than hydrogen; or a pharmaceutically acceptable acid-addition salt thereof.

4,959,364

METHOD OF TREATING INFLAMMATION, ALLERGY, ASTHMA AND PROLIFERATIVE SKIN DISEASE USING HETEROCYCLIC AMIDES

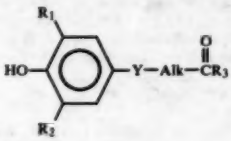
Richard A. Mueller, Glencoe, and Richard A. Partis, Evanston, both of Ill., assignors to G. D. Searle & Co., Chicago, Ill.

Division of Ser. No. 224,647, Jul. 27, 1988, abandoned, which is a continuation of Ser. No. 809,964, Dec. 20, 1985, abandoned, which is a continuation-in-part of Ser. No. 698,047, Feb. 4, 1985, abandoned. This application Nov. 13, 1989, Ser. No. 435,230

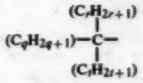
Int. Cl.[5] **A61K** *31/40, 31/445, 31/505, 31/535*

U.S. Cl. 514—237.5 **12 Claims**

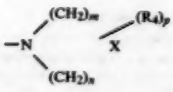
1. A method of treating inflammation comprising administering to an animal in need of such treatment a therapeutically effective amount of a compound of the formula:



wherein: R_1 and R_2 are the same or different members of the group consisting of halo, phenyl, substituted phenyl and a



group wherein q, r and t are independently an integer of from 1 to 8 provided that q +r +t is equal to or less than 10; Y is thio or sulfinyl; Alk is straight or branched chain lower alkylene; and R_3 is a heterocyclic amine represented by the formula:



wherein R_4 is selected from the group consisting of hydrogen, lower alkyl, phenyl, substituted phenyl, benzyl, substituted benzyl, carboxyl or caboxyloweralkyl; X is selected from the group consisting of N-R_4, 0 and —CH_2; m is 2 or 3; n is 2 or 3 when X is 0 or N-R_4, and is 1 to 3 when X is CH_2; p is 0 to 2; or the pharmaceutical acceptable salts thereof.

4,959,365

TOPICAL COMPOSITIONS OF LIPOPHILIC PHARMACEUTICALS AGENTS

Michael L. Francoeur, Stonington, and Russell O. Potts, Old Saybrook, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 161,926, Feb. 29, 1988, which is a continuation-in-part of Ser. No. 925,641, Oct. 31, 1986, abandoned. This application Apr. 18, 1989, Ser. No. 340,112

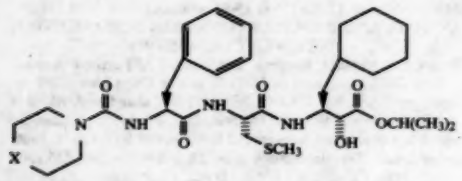
Int. Cl.[5] **A61K** *31/535, 31/505*

U.S. Cl. 514—237.5 **28 Claims**

1. A pharmaceutical composition for the topical treatment of psoriasis or hypertension in a human or lower animal which comprises

(a) a safe and effective amount of a lipophilic pharmaceutical agent; wherein for the treatment of psoriasis the agent is

5-hydroxy-4,5-dimethyl-2-(6-phenylhexyl)aminopyrimidine or a pharmaceutically acceptable acid addition salt thereof; and for the treatment of hypertension the agent is compound of the formula



where X is O or C=O;

(b) a solvent system comprising water and from about 15 to 75% by volume of one or more water miscible solvents selected from the group consisting of methanol, ethanol and isopropyl alcohol; and

(c) from about 0.01 to 5% (w/v) of a compound which is a 1-alkylazacycloheptan-2-one, said alkyl having from 8 to 16 carbon atoms, or a cis-olefin of the formula

$$CH_3(CH_2)_xCH{=}CH(CH_2)_yR^3$$

where R^3 is CH_2OH, CH_2NH_2 or COR, and R^4 is OH or $(C_1–C_4)$alkoxy, x and y are each an integer from 3 to 13 and the sum of x and y is from 10 to 16;

wherein in said solvent system said water miscible solvent content is within 10% of that which gives optimal flux across the topical biomembrane and/or maximal intramembrane levels for said agent.

15. A method of treating psoriasis or hypertension in a human or lower animal which comprises topical administration f a psoriasis alleviating or antihypertensive amount of a pharmaceutical composition of claim 1.

4,959,366

ANTI-ARRHYTHMIC AGENTS

Peter E. Cross, Geoffrey N. Thomas, and John E. Arrowsmith, all of New York, N.Y., assignors to Pfizer Inc., New York, N.Y.

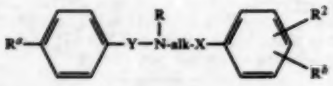
Filed Apr. 29, 1987, Ser. No. 44,086

Claims priority, application United Kingdom, May 1, 1986, 8610668; Ireland, Dec. 17, 1986, 8630059

Int. Cl.[5] **C07C** *143/75, 93/06*

U.S. Cl. 514—239.5 **48 Claims**

1. A compound of the formula:



(A)

or a pharmaceutically acceptable salt thereof;

wherein

R^a is $—NO_2$, $—NH_2$ or $—NHSO_2R^1$ where R^1 is a $C_1–C_4$ alkyl group;

R^b is $—NO_2$, $—NH_2$ or R^3 where R^3 is $—NHSO_2(C_1–C_4$ alkyl) or $—CONR^4R^5$ where R^4 and R^5 are each independently H or $C_1–C_4$ alkyl or together with the nitrogen atom to which they are attached represent a 1-pyrrolidinyl, piperidino, morpholino or N-methylpiperazin-1-yl group; with the proviso that when one of R^a and R^b is $—NO_2$, then the other is not $—NH_2$;

X is O or S absent;

Y is an ethylene group optionally substituted by a methyl group;

"alk" is an ethylene, trimethylene or tetramethylene group, "alk" being optionally substituted by a methyl group;

R is $C_1–C_4$ alkyl; and

R^2 is H, halo, CF_3 or $C_1–C_4$ alkyl.

48. A method of treating cardiac arrhythmia comprising administering to an arrhythmic host in need of such treatment an anti-arrhythmic effective dose of a compound of claim 2 in combination with a pharmaceutically acceptable diluent or carrier.

4,959,367

4-OXO-1,2,3-BENZOTRIAZINES

Francis D. King, Bishop's Stortford, England, assignor to Beecham Group P.L.C., Middlesex, England

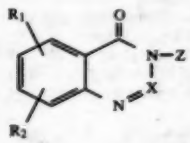
Filed Nov. 2, 1988, Ser. No. 266,122

Claims priority, application United Kingdom, Nov. 4, 1987, 8725840; Feb. 11, 1988, 8803110

Int. Cl.[5] **C07D** *401/04, 401/14, 403/04;* **A61K** *31/53*

U.S. Cl. 514—243 **10 Claims**

1. A compound of formula (I), or a pharmaceutically acceptable salt thereof:



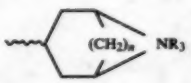
(I)

wherein

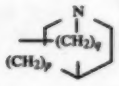
X is N;

R_1 and R_2 are the same or different and are hydrogen, halogen, CF_3, C_{1-6} alkyl, C_{1-7} acyl, C_{1-7} acylamino, or amino, aminocarbonyl or aminosulphonyl, optionally substituted by one or two C_{1-6} alkyl or C_{3-8} cycloalkyl groups, or by C_{4-5} polymethylene or by phenyl, C_{1-6} alkylsulphonyl, C_{1-6} alkylsuphinyl, C_{1-6} alkoxy, C_{1-6} alkylthio, hydroxy or nitro; or R_1 and R_2 taken together are methylenedioxy or ethylenedioxy;

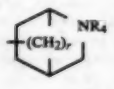
Z is a group of formula (a), (b) or (c)



(a)



(b)



(c)

wherein

n is 2 or 3; p is 1 or 2; q is 1 to 3; r is 1 to 3; and

R_3 or R_4 is C_{1-4} alkyl.

9. A pharmaceutical composition comprising a $5\text{-}HT_3$ antagonist effective amount of a compound according to claim 1 and a pharmaceutically acceptable carrier.

4,959,368

THERAPEUTIC AGENT FOR NEUROLOGICAL DISEASES

Akira Awaya; Takuo Nakano, both of Yokohama; Hisashi Kobayashi, Mobara; Ken E. Tan, Kamakura; Kazutoshi Horikomi; Tadayuki Sasaki, both of Mobara; Keiichi Yokoyama; Hiroyasu Ohno, boh of Iwakuni; Kozi Kato, Yamaguchi; Takumi Kitahara; Ikuo Tomino, both of Ohtake, and Shigeru Isayama, Tokyo, all of Japan, assignors to Mitsui Petrochemical Industries Ltd. and Mitsui Pharmaceuticals, Inc., both of Tokyo, Japan

PCT No. PCT/JP87/00120, § 371 Date Oct. 22, 1987, § 102(e) Date Oct. 22, 1987, PCT Pub. No. WO87/04928, PCT Pub. Date Aug. 27, 1987

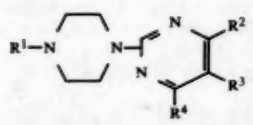
PCT Filed Feb. 24, 1987, Ser. No. 130,533

Claims priority, application Japan, Feb. 24, 1986, 61-37244; Mar. 31, 1986, 61-73443

Int. Cl.[5] A61K *31/505;* **C07D** *403/04, 403/14*

U.S. Cl. 514—252 **43 Claims**

13. A method for treating a patient having a neurological disease comprising a disorder of the peripheral nerves or central nerves requiring the proliferation of nerve cells, the formation and sprouting of neurites, nerve regeneration or motor function recovery, said method comprising administering to said patient a neurologically effective amount of a pyrimidine represented by the following formula (I)



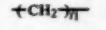
(I)

wherein R^1 represents a hydrogen atom, an acyl group having 2 to 4 carbon atoms, an alkoxycarbonyl group having 2 to 5 carbon atoms, an alkoxycarbonylmethyl group having 3 to 5 carbon atoms, a 3,4-dimethoxybenzoyl group or a 3,4-methylenedioxybenzyl group,

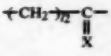
R^2 represents a hydrogen atom, an amino group, a monoalkylamino group having 1 to 4 carbon atoms, an alkoxy group having 1 to 5 carbon atoms or an alkoxycarbonyl group having 2 to 4 carbon atoms,

R^3 represents a hydrogen atom, an alkoxycarbonyl group having 2 to 4 carbon atoms, a dialkylaminocarbonyl group having 1 to 9 carbon atoms in each alkyl moiety, an alkoxy group having 1 to 5 carbon atoms, or a hydroxyethyl group,

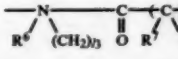
R^2 and R^3 may together form a group selected from



wherein l_1 is a number of 2, 3 or 4,

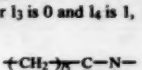


wherein X is =O or =N—R^5 in which R^5 is a hydroxyl, benzenesulfonyloxy or toluenesulfonyloxy group, and l_2 is a number of 2, 3 or 4,



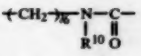
wherein R^6 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, or an alkoxyalkyl group resulting from substitution of an alkyl group having 2 to 4 carbon atoms by an alkoxy group having 1 to 4 carbon atoms, R^7 and R^8 are identical or different and each represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms and

l_3 is 2 and l_4 is 0, or l_3 is 0 and l_4 is 1,

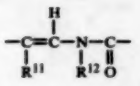


wherein R^9 represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and

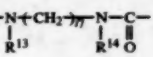
l_5 is a number of 2 or 3,



wherein R^{10} represents a hydrogen atom, an alkyl group having 1 to 10 carbon atoms, an acyl group having 1 to 4 carbon atoms or a carbamoylmethyl group, and l_6 is a number of 1 or 2,



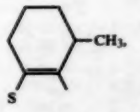
wherein R^{11} represents a hydrogen atom, a formyl group, an alkyl group having 1 to 4 carbon atoms or an aralkyl group having 7 to 9 carbon atoms and R^{12} represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, an alkenyl group having 3 to 4 carbon atoms, a hydroxyalkyl group having 2 to 4 carbon atoms, an alkoxyalkyl group resulting from substitution of an alkyl group having 2 to 4 carbon atoms by an alkoxy group having 2 to 4 carbon atoms, a benzyl group or a cycloalkyl group having 3 to 6 carbon atoms,



wherein R^{13} and R^{14} are identical or different and each represents a hydrogen atom or an alkyl group having 1 to 4 carbon atoms, and l_7 is a number of 0, 2 or 3, or

—E—G—

wherein —E—G— is —OCH_2CH_2—, —$OC(CH_3)$=CH—, —CH_2OCO—, —$OCOCH_2$—, —$CH_2C(CH_3)OCO$—, —$N(CH_3)CH_2CH_2$—, —CH=CH—CH=CH—, —CH=$C(OCH_3)$—$C(OCH_3)$=CH—, or



and

R^4 represents a hydrogen atom, an alkyl group having 1 to 4 carbon atoms, or an alkylthio group having 1 to 4 carbon atoms, or a pharmaceutically acceptable salt thereof.

4,959,369

SYNERGISTIC COMBINATIONS

Aws S. M. Salim, Department of Surgery, Royal Infirmary, Perth, PH1 1NX, Scotland

Filed Feb. 1, 1988, Ser. No. 150,896

Int. Cl.[5] A61K *31/195, 31/52*

U.S. Cl. 514—264 **18 Claims**

1. A combination suitable for use in improving the condition of skin and mucosa which combination comprises an S-methyl

substituted ternary sulphonium derivative of methionine and cysteine wherein said cysteine and methionine derivative are present in a relative ratio of from 1:10 to 10:1, by weight.

4,959,370

ALKALOIDS OF MARINE ORIGIN

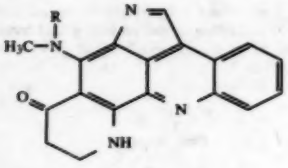
Phillip Crews, 7777 Monterey St., Santa Cruz, Calif. 95060; Thomas R. Matthews, 1579 Hidden Hill Pl., Los Gatos, Calif. 95030, and Wayne D. Inman, 11591 Lake Blvd., Felton, Calif. 95018

Filed Mar. 29, 1989, Ser. No. 330,164

Int. Cl.[5] A61K *31/44*; C07D *471/16*

U.S. Cl. 514—280 **11 Claims**

1. A compound of Formula (I):



(I)

wherein R is hydrogen or methyl, or a pharmaceutically acceptable salt thereof.

4,959,371

ISOQUINOLINE DERIVATIVES WITH ANTI-TUMOR ACTIVITY

Gordon H. Phillipps, Wembley, and Michael G. Lester, Rickmansworth, both of United Kingdom, assignors to Glaxo Group Limited, London, England

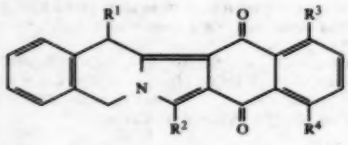
Filed Nov. 25, 1987, Ser. No. 125,173

Claims priority, application United Kingdom, Nov. 27, 1986, 8628349; Nov. 27, 1986, 8628351; Nov. 27, 1986, 8628352

Int. Cl.[5] C07D *221/18*; A61K *31/445*

U.S. Cl. 514—283 **17 Claims**

1. A compound of formula (I)



(I)

wherein

R^1 is a hydrogen atom or a methyl group;

R^2 is a hydrogen or halogen atom or a methyl group; and one of R^3 and R^4 is a hydrogen atom and the other is a group $—NR^5R^6$ (where R^5 is a hydrogen atom and R^6 is a group $—COCH_2NR^7R^8$ (wherein R^7 and R^8, which may be the same or different, each represents a hydrogen atom or a C_{3-7} cycloalkyl group or a C_{1-4} alkyl group optionally substituted by a hydroxyl or benzoyloxy group), or R^6 is a group $—COCH_2NH(CH_2)_nNR^7R^8$ (where n is an integer from 2 to 5 inclusive and R^7 and R^8 are as defined above), or R^6 is a group $—N{=}CR^9R^{10}$ (where R^9 is a hydrogen atom or a C_{1-4} alkyl group and R^{10} is a C_{1-4} alkyl group optionally substituted by a group $—NR^7R^8$ and R^7 and R^8 are as defined above) or R^5 is a hydrogen atom, a benzoyl group, a phenyl C_{1-6} alkanoyl group, a C_{1-6} alkanoyl group, or a halogenated C_{1-6} alkanoyl group, and R^6 is a group $—(CH_2)_nNR^7R^8$ (where n, R^7 and R^8 are as defined above)) or a salt thereof.

15. A pharmaceutical composition comprising as an active ingredient a compound of formula (I) (as defined in claim 1) or a physiologically acceptable salt thereof, together with one or more pharmaceutical carriers or excipients.

4,959,372

ANTI-HYPERTENSIVE SUBSTITUTED 2-AZABICYCLOOCTANE-3-CARBOXYLIC ACIDS

Michel Vincent, Bagneux; Georges Remond, Versailles, and Michel Laubie, Vaucresson, all of France, assignors to Adir et lie, Neuilly-sur-Seine, France

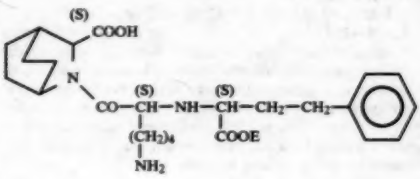
Filed Aug. 26, 1988, Ser. No. 237,497

Claims priority, application France, Aug. 28, 1987, 87 12013

Int. Cl.[5] A61K *31/44*; C07D *471/08*

U.S. Cl. 514—299 **6 Claims**

1. The compounds of formula (I):



(I)

in which E is a hydrogen atom or a lower alkyl radical, as well as their addition salts with a pharmaceutically acceptable base or acid.

4,959,373

BISPIDINE DERIVATIVES AS CLASS III ANTIARRHYTHMIC AGENTS

Wilfried Lubisch, Mannheim; Fritz Binnig, Fussgoenheim, and Gerda von Philipsborn, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

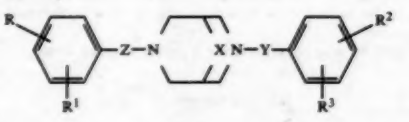
Filed Sep. 22, 1988, Ser. No. 247,645

Claims priority, application Fed. Rep. of Germany, Sep. 24, 1987, 3732094

Int. Cl.[5] C07D *471/02*

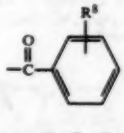
U.S. Cl. 514—300 **11 Claims**

1. A bispidine derivative of the formula (I):



I

wherein R, R^1 and R^3 are identical or different and are each hydrogen, C_1–C_4-alkyl, halogen or C_1–C_4-alkoxy; X is $—CH_2—$, $—C(O)—$ or $—C(R^6)(OR^7)—$, wherein R^6 is hydrogen or C_1–C_4-alkyl and R^7 is hydrogen, C_1–C_4-alkyl or a moiety of the formula:



wherein R^8 is hydrogen, C_1–C_4-alkyl, halogen or C_1–C_4-alkoxy; Y is $—CONH—$; Z is C_1–C_4-alkylene and R^2 is $—NO_2$, $—NH_2$, C_1–C_4-alkyl, halogen, $—CN$, C_1–C_4-alkoxy, $—NHSO_2CH_3$, $—CF_3$, —NH-acetyl or $—NR^9R^{10}$, wherein R^9 is C_1–C_4-alkyl and R^{10} is hydrogen or C_1–C_4-alkyl; or the pharmaceutically-acceptable salts thereof.

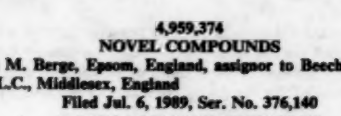
4,959,374

NOVEL COMPOUNDS

John M. Berge, Epsom, England, assignor to Beecham Group P.L.C., Middlesex, England

Filed Jul. 6, 1989, Ser. No. 376,140
Int. Cl.[5] A61K 31/47; C07D 401/06
U.S. Cl. 514—307 7 Claims

1. A compound of formula (I):



(I)

or a pharmaceutically acceptable salt, ester or amide thereof, wherein: Z represents a residue of a substituted or substituted aryl group, said aryl group being a phenyl or naphthyl group, X represents 0 or NR^* wherein R^* represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted aryl group, an alkanoyl group substituted or unsubstituted in the alkyl moiety, or an arylalkyl moiety substituted or unsubstituted in the aryl moiety, n represents an integer 1 or 2, m represents an integer 1 or 2, p represents an integer 2 or 3, with the proviso that when n=1 and m=1, then p is not 2, and q represents an integer in the range of from 1 to 12; and wherein the substituents for any aryl group or alkyl group includes up to five groups selected from halogen, alkyl, alkenyl, alkynyl, phenyl, haloalkyl, hydroxy, alkoxy, arylalkyloxy, amino, mono- and di- alkylamino, aminoalkyl, mono- an di- alylaminoalkyl, nitro, carboxy, carboxyalkyl, alkoxycarbonyl, alkoxycarbonylalkyl or alkycarbonyl.

7. A pharmaceutical composition comprising a compound of claim 1 of the formula (I), or a pharmaceutically acceptable salt, ester or amide thereof, and a pharmaceutically acceptable carrier therefor.

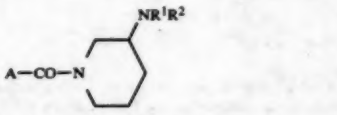
4,959,375

PIPERIDINE DERIVATIVES USEFUL AS 5-HT_3 ANTAGONISTS

Terence J. Ward, Maidenhead, England, assignor to John Wyeth & Brothers Limited, Maidenhead, England

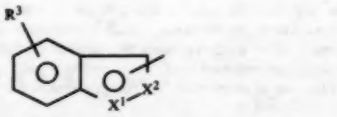
Filed Feb. 21, 1989, Ser. No. 313,104
Claims priority, application United Kingdom, Mar. 3, 1988, 8805064
Int. Cl.[5] A61K 31/445; C07D 211/98
U.S. Cl. 514—323 11 Claims

10. A method for antagonizing 5-HT_3 receptors in a mammal, which comprises administering to a mammal in need thereof an amount effective to antagonize 5-HT_3 receptors of a compound of formula I



(I)

or a pharmaceutically acceptable acid addition salt thereof, wherein A represents an aromatic radical of the formula



wherein

R^3 is hydrogen, (C_{1-4})alkyl, (C_{1-4}) alkoxy or halogen;

X^1—X^2 represents NR^4—CH, CH_2—N, NR^4—N, CH—NR^4or N—NR^4, where R^4 is hydrogen, (C_{1-4})alkyl, phenyl or phenyl(C_{1-4})alkyl; and

R^1 and R^2 are independently hydrogen, (C_{1-4})alkyl or (C_{1-4})alkylphenyl or R^1 and R^2 together with the nitrogen atom to which they are attached represent pyrrolidino or piperidino.

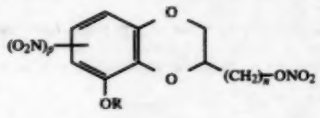
4,959,376

1,4-BENZODIOXANE DERIVATIVES

Toshinobu Kunii; Norio Minami; Fumihiro Ozaki; Nobuyuki Mori; Mikio Takeda, and Hiroshi Katoh, all of Ibaraki, Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 887,720, Jul. 18, 1986, Pat. No. 4,794,118. This application Oct. 4, 1988, Ser. No. 253,023
Claims priority, application Japan, Jul. 23, 1985, 60-161096
The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.
Int. Cl.[5] A61K 31/455
U.S. Cl. 514—338 1 Claim

1. A pharmacological composition which comprises a 1,4-benzodioxane derivative represented by the following formula:



wherein p represents an integer of 0–2, R denotes hydrogen atom, a lower alkyl, a lower alkoxycarbonyl, an alkanoyl, or nicotinoyl group, and n is an integer of 1–3, or a pharmacologically acceptable salt thereof and a pharmacologically acceptable carrier.

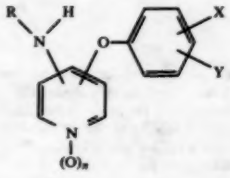
4,959,377

PHENOXYPYRIDINAMINE COMPOUNDS WHICH ARE USE AS A DERMATOLOGICAL COMPOSITION

Richard C. Effland; Joseph T. Klein, both of Bridgewater; Gordon E. Olsen, Somerset, and Larry Davis, Sergeantsville, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Jun. 29, 1989, Ser. No. 372,970
Int. Cl.[5] C07D 213/30; A61K 31/44
U.S. Cl. 514—349 30 Claims

1. A compound having the formula,



where

n is 0 or 1;

X is hydrogen, loweralkyl, loweralkoxy, halogen, formyl, loweralkylcarbonyl, loweralkoxycarbonyl, loweralkoxycarbonylloweralkyl or hydroxymethyl;

Y is hydrogen or halogen; and

R is hydrogen, loweralkyl, aryllowerakyl or loweralkylcarbonyl,

or a pharmaceutically acceptable acid addition salt thereof.

4,959,378

AMINOPYRIDINYLAMINOPHENOL COMPOUNDS USEFUL AS TOPICAL ANTIINFLAMMATORY AGENTS FOR THE TREATMENT OF SKIN DISORDERS

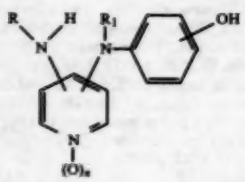
Richard C. Allen, Flemington; Joseph T. Klein, and Richard C. Effland, both of Bridgewater, all of N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.

Filed Oct. 24, 1989, Ser. No. 425,713

Int. Cl.[5] A61K *31/44*; C07D *213/26*

U.S. Cl. 514—352 **20 Claims**

1. A compound having the formula,



where

R is hydrogen, loweralkyl, aryllowerallkyl or loweralkylcarbonyl;

R_1 is hydrogen, loweralkyl or loweralkylcarbonyl; and

n is 0 or 1;

the term aryl signifying a phenyl group optionally mono-substituted with a loweralkyl, loweralkoxy, halogen or trifluoromethyl group; or a pharmaceutically acceptable acid additon salt thereof.

4,959,379

PESTICIDAL 7-SUBSTITUTED 2-CARBOXAMIDO-BENZOTHIAZOLE 3-OXIDES

Klaus Wagner, Cologne, and Gerd Hänssler, Leverkusen, both of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

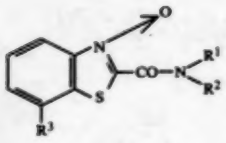
Filed Mar. 21, 1989, Ser. No. 326,753

Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810076; Oct. 20, 1988, 3835660

Int. Cl.[5] C07D *277/68*; A01N *43/78*

U.S. Cl. 514—367 **11 Claims**

1. A 7-substituted 2-carboxamido-benzothiazole 3-oxide of the formula

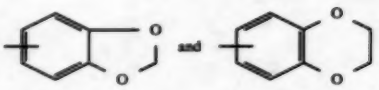


in which

R^1 stands for hydrogen or for straight-chain or branched alkyl which has 1 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, hydroxyl, C_1-C_4-alkoxy, C_1-C_4-alkoxy-carbonyl and di-(C_1-C_4-alkyl)-amino,

R^2 stands for hydrogen, hydroxyl, ureido, for straight-chain or branched alkyl which has 1 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, hydroxyl, cyano, benzyl, C_1-C_4-alkoxy, C_1-C_4-alkoxycarbonyl, C_1-C_4-alkylaminocarbonyl and di-(C_1-C_4-alkyl)-amino, for cycloalkyl which has 3 to 6 carbon atoms in the cycloalkyl moiety and 1 to 3 carbon atoms in the alkyl moiety and which are optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, and C_1-C_4-alkyl, for straight-chain or branched alkenyl which has 3 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, cyano and

C_1-C_4-alkoxy-carbonyl, for straight-chain or branched alkinyl which has 3 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, cyano and C_1-C_4-alkoxy-carbonyl, for straight-chain or branched alkoxy which has 1 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, cyano C_1-C_4-alkoxy and C_1-C_4-alkoxy-carbonyl, for straight-chain or branched alkenyloxy which has 3 to 6 carbon atoms and which is optionally substituted once, twice or three times by identical or different halogen substitutents, or stands for benzyloxy which is optionally substituted once, twice or three times by identical or different substitutents from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkoxy-carbonyl and halogenalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, for aralkyl which has 6 to 10 carbon atoms in the aryl moiety and 1 to 4 carbon atoms in the straight-chain or branched alkyl moiety and which is optionally substituted once, twice or three times in each of the acyl and/or alkyl moiety by identical or different substituents from the group consisting of halogen, hydroxy, phenyl, nitro, cyano, C_1-C_4-alkyl, C_1-C_4-alkoxy, C_1-C_4-alkoxy-carbonyl and halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, for phenyl or naphthyl which are optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, hydroxyl, nitro, cyano, C_1-C_4-alkyl, halogenoalkyl having 1 or 2 carbon atoms and 1 to 5 identical or different halogen atoms, C_1-C_4-alkoxy, C_1-C_2-halogenoalkoxy, C_1-C_4-alkylthio, C_1-C_2-halogenoalkylthio and C_1-C_4-alkoxy-carbonyl, or stands for a single-ring heterocyclic radical or a double-ring heterocyclic radical selected from the group consisting of furyl, thienyl, oxazolyl, thiazolyl, oxadiazolyl, thiadiazolyl, pyridyl, pyrimidinyl, pyrrolidinyl, thiomorpholinyl, morpholinyl,

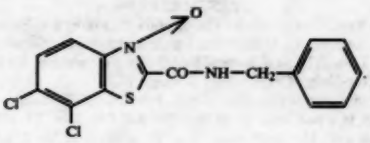


each of which is optionally linked via a straight-chain or branched alkylene chain having 1 to 4 carbon atoms and each of which is optionally substituted once, twice or three times by identical or different substituents from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, C_1-C_4-alkoxy and C_1-C_4-alkoxy-carbon or

R^1 and R^2 together stand for an alkylene chain which has 2 to 8 ring number members and which is optionally substituted once, twice or three times by identical or different C_1-C_4-alkyl substituents and which is optionally interrupted by one or more than one oxygen atoms, and

R^3 stands for halogen.

9. The compound is 6,7-dichloro-2-benzylamino-carbonyl-benzothiazole -oxide of the formula



4,959,380

METHOD OF TREATING PEOPLE TO STOP SMOKING AND COMPOSITION

Jordan E. Wilson, 967 Continental, Detroit, Mich. 48215

Filed Dec. 19, 1988, Ser. No. 286,183
Int. Cl.[5] A61K *31/44, 31/125*
U.S. Cl. 514—356 13 Claims

1. The method of treating people to stop smoking comprising the steps of:
   (a) brewing strong caffeine-based tea in an open container including about two tea bags and one-half cup of boiling water;
   (b) immersing 10 to 20 absorbent cotton balls in the tea;
   (c) partly immersing 6 to 8 cigarettes into the tea and cotton balls for 4 to 8 hours until the tea is absorbed into the cigarettes throughout their length and staining the cigarettes to a dark brown color;
   (d) dispersing about 1¼ cups of cyrstallized camphor in an enclosed room;
   (e) placing the container in said enclosed room in an atmosphere of vaporized camphor crystals for 5 to 10 minutes; and
   (f) breathing the camphorized atmosphere while visually concentrating upon the appearance of the cigarettes in the container and smelling the exuded nicotine and caffeine aroma from the container for a period of about 20 minutes;
some users psychologically responding to the appearance of the cigarettes and the aroma of the caffeine and nicotine in a lung-cleansing camphor atmosphere and losing all interest in smoking another cigarette.

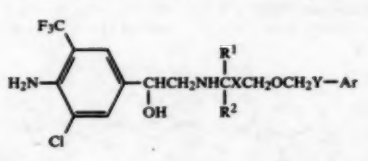
4,959,381

PYRIDINE COMPOUNDS WHICH HAVE USEFUL ACTIVITY ASSOCIATED WITH REVERSIBLE AIR WAYS OBSTRUCTION

Lawrence H. C. Lunts, Broxbourne; Ian F. Skidmore, Welwyn; Harry Finch, Letchworth; Alan Naylor, Royston, and Ian B. Campbell, Dane End, all of England, assignors to Glaxo Group Limited, London, England

Filed Feb. 9, 1988, Ser. No. 153,939
Claims priority, application United Kingdom, Feb. 10, 1987, 8703005; Feb. 10, 1987, 8703006
Int. Cl.[5] A61K *31/44*
U.S. Cl. 514—357 12 Claims

1. A compound of formula (I)



wherein
X represents a bond, or a C_{1-6} alkylene, C_{2-6} alkenylene or C_{2-6} alkynylene chain, and
Y represents a bond, or a C_{1-4} alkylene, C_{2-4} alkenylene or C_{2-4} alkynylene chain, where the sum total of carbon atoms in X and Y is from 1 to 8;
R^1 and R^2 each represent a hydrogen atom or a C_{1-3} alkyl group, where the sum total of carbon atoms in R^1 and R^2 is from 1 to 4; and
Ar represents a pyridyl group optionally substituted by one or two substituents selected from halogen atoms or hydroxy, C_{1-3} alkyl and C_{1-3} alkoxy groups or a physiologically acceptable salt or solvate thereof.

10. A method of therapy or prophylaxis of a disease associated with reversible airways obstruction in a patient which comprises administering to said patient an effective amount to alleviate said disease of a compound of formula (I) as defined in claim 1 or a physiologically acceptable salt or solvate thereof.

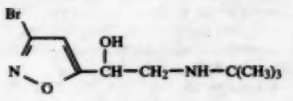
4,959,382

USE OF CERTAIN COMPOUNDS IN LIVESTOCK FOOD AS GROWTH PROMOTANTS FOR BETTER FEED UTILIZATION AND IMPROVED CARCASS COMPOSITION

Larry A. Muir, Flemington, N.J., assignor to Merck & Co., Inc., Rahway, N.J.

Division of Ser. No. 177,210, Apr. 4, 1988, Pat. No. 4,847,302, which is a division of Ser. No. 731,255, May 8, 1985, Pat. No. 4,761,421, which is a continuation-in-part of Ser. No. 617,299, Jun. 4, 1984, abandoned. This application Apr. 3, 1989, Ser. No. 331,729
Int. Cl.[5] A61K *31/42*
U.S. Cl. 514—378 1 Claim

1. A method for improving the growth of livestock which comprises administering to such livestock a sufficient amount of a compound having the formula:



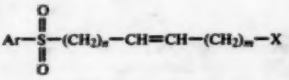
4,959,383

PHENYLSULFONE ALKENOIC ACIDS, DERIVATIVES THEREOF, COMPOSITIONS CONTAINING SAME AND METHOD OF USE

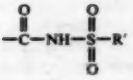
Steven E. Hall, Trenton, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Oct. 31, 1988, Ser. No. 264,938
Int. Cl.[5] A61K *31/41, 31/21, 31/19, 31/18*
U.S. Cl. 514—381 9 Claims

1. A compound having the structure



wherein Ar is a phenyl or naphthyl group which is unsubstituted or substituted with one, two or three of halogen, lower alkyl, lower alkoxy, phenyl, hydroxy, alkanoyl, benzoyl, alkylamino, alkoxycarbonyl or carboxy;
X is COOR where R is hydrogen, alkali metal or lower alkyl or X is 5tetrazolyl or



wherein
R′ is lower alkyl, phenyl or naphthyl;
n is 2, 3 or 4; and
m is 2, 3 or 4;
and each of the $(CH_2)_n$ and $(CH_2)_m$ groups may be unsubstituted or optionally substituted with one or two lower

alkyl groups and/or are one or two lower alkoxy groups.

9. A composition for inhibiting arachiodonic acid-induced platelet aggregation and bronchoconstriction comprising a therapeutically effective amount of a compound as defined in claim 1 and a pharmaceutically acceptable carrier therefor.

4,959,384

USE OF NITROFURANTOIN FOR THE TREATMENT AND PROPHYLAXIS OF GASTROINTESTINAL DISORDERS

William G. Kraft, Norwich, and Donna R. Morgan, Sherburne, both of N.Y., assignors to Norwich Eaton Pharmaceuticals, Inc., Norwich, N.Y.

Filed Oct. 24, 1985, Ser. No. 790,919
Int. Cl.[5] A61K *31/415*
U.S. Cl. 514—390 11 Claims

1. A method for the treatment of a human subject having an infectious gastrointestinal disorder of the stomach or duodenum which is caused or mediated by *Campylobacter pyloridis* (renamed *Helicobacter pylori*) comprising the step of administering to said subject a safe and effective amount of nitrofurantoin.

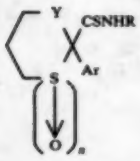
4,959,385

THIOFORMAMIDE DERIVATIVES

David C. Cook, London; Terance W. Hart, Brentwood; Iain M. McLay, Leughton; Malcolm N. Palfreyman, Upminster; Roger J. Walsh, Rayleigh, all of England, and Jean-Claude Aloup, Villeneuve-le-Roi, France, assignors to May & Baker Limited, Dagenham, England

Filed Jan. 19, 1989, Ser. No. 299,039
Claims priority, application United Kingdom, Jan. 21, 1988, 8801300
Int. Cl.[5] A61K *31/38*; C07D *333/20, 335/02, 337/04*
U.S. Cl. 514—431 8 Claims

1. A thioformamide derivative of the formula:



I

wherein R represents a straight- or branched-chain alkyl radical containing from 1 to 4 carbon atoms, Ar represents a phenyl group unsubstituted or substituted in the 3- and/or 5-position with an electron-withdrawing group selected from a cyano, nitro, trifluoromethyl, carbamoyl, carboxy, C_{2-5}-alkanoyl, C_{2-5}-alkoxycarbonyl or C_{1-4}-alkylsulphonyl group or a fluorine, chlorine or bromine atom, and optionally further substituted on the phenyl group with halogen atom(s), C_{1-4}-alkyl or phenyl group(s) or the group Ar may be substituted with halogen atom(s), C_{1-4}-alkyl or phenyl group(s) or with substituents which together form a naphthyl ring, Y represents an ethylene or methylene radical or a valency bond, and n represents 0 or 1, or a pharmaceutically acceptable salt thereof.

8. A pharmaceutical composition useful in the treatment of disorders associated with vascular smooth muscle contraction, respiratory smooth muscle contraction and contraction of smooth muscle of gastro-intestinal tract, urinary bladder and uterus which comprises a therapeutically effective amount of a thioformamide derivative of formula (I) as defined in claim 1 or a pharmaceutically acceptable salt thereof in association with a pharmaceutically acceptable carrier or coating.

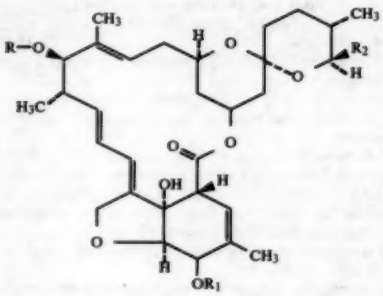
4,959,386

PESTICIDES

Bruno Frei, Liestal, Switzerland; Hari B. Mereyala, Pune, India; Anthony C. O'Sullivan, Basel, Switzerland; Kazuo Sato, and Toshiaki Yanai, both of Kanagawa, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 18,688, Feb. 25, 1987, abandoned, which is a continuation of Ser. No. 807,580, Dec. 11, 1985, abandoned. This application Sep. 28, 1988, Ser. No. 252,031
Claims priority, application Switzerland, Dec. 14, 1984, 5940/84; May 30, 1985, 2289/85
Int. Cl.[5] A61K *31/365*; C07D *315/00*
U.S. Cl. 514—450 7 Claims

1. A 13β-substituted compound of the formula:



wherein:

R is pivaloyl;

R_1 is hydrogen; alkanoyl of 2 to 11 carbon atoms, unsubstituted or substituted with halo; benzoyl, unsubstituted or substituted by halo, alkyl of 1 to 3 carbon atoms, haloalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, haloalkoxy of 1 to 3 carbon atoms, cyano, or nitro; or phenylacetyl, unsubstituted or substituted by halo, alkyl of 1 to 3 carbon atoms, haloalkyl of 1 to 3 carbon atoms, alkoxy of 1 to 3 carbon atoms, haloalkoxy of 1 to 3 carbon atoms, cyano, or nitro; and

R_2 is methyl, ethyl, isopropyl, or sec.-butyl.

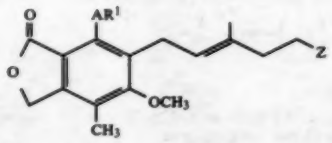
4,959,387

MYCOPHENOLIC ACID DERIVATIVES IN THE TREATMENT OF RHEUMATOID ARTHRITIS

Peter H. Nelson, Los Altos; Anthony C. Allison; Elsie M. Eugui, both of Belmont, and Joseph M. Muchowski, Sunnivale, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 821,633, Jan. 23, 1986, Pat. No. 4,725,622. This application Nov. 24, 1987, Ser. No. 125,027
Int. Cl.[5] A61K *31/34*
U.S. Cl. 524—469 1 Claim

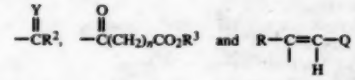
1. A method of treating rheumatoid arthritis, which method comprises administering to a mammal in need of such a treatment a therapeutically effective amount of a compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein:

A is oxygen or sulfur;

R^1 is selected from the group consisting of H,



in which

Y is oxygen or sulfur;

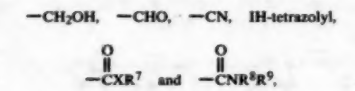
R^2 is alkyl, haloalkyl or $-NR^4R^5$, where R^4 and R^5 are independently H, alkyl, haloalkyl, cycloalkyl, phenyl optionally monosubstituted with halogen, hydroxy, carboxy, chlorocarbonyl, nitro, cyano, phenyl, alkyl, acyl, alkoxycarbonyl, acylamino, dialkylamino or dialkylaminoethoxycarbonyl, phenyl optionally disubstituted with hydroxy, carboxy, nitro or alkyl, or benzyl optionally substituted with dialkylamino;

n is an integer from 0–6;

R^3 is H alkyl or a pharmaceutically acceptable cation;

Q and R are independently H or $-CO_2R^3$; and

Z is selected from the group consisting of



in which

X is oxygen or sulfur;

R^7 is H, alkyl, alkenyl cycloalkyl, optionally substituted phenyl, optionally substituted benzyl or a pharmaceutically acceptable cation; and

R^8 and R^9 are independently H, alkyl or cycloalkyl, or R^8 and R^9 taken together are $-(CH_2)_4-$, $-(CH_2)_5-$ or $-(CH_2)_2O(CH_2)_2-$;

with the provisos that:

Z can not be

if A is oxygen and Z can not be

if A is sulfur and R^1 is H

alkyl includes from one to six carbon atoms,

cycloalkyl includes cyclopentyl, cyclohexyl or cycloheptyl,

optionally substituted phenyl includes a phenyl moiety optionally bearing one to three substituents independently chosen from the group consisting of halogen, hydroxy, carboxy, chlorocarbonyl, aminosulfonyl, NO_2, CN, alkyl having one to six carbon atoms, alkoxycarbonyl, acylamino, and dialkylaminoethoxycarbonyl, and

optionally substituted benzyl includes a benzyl moiety optionally bearing one to three substituents independently selected from the group consisting of halogen, hydroxy, carboxy, chlorocarbonyl, aminosulfonyl, NO_2, CN, alkyl having one to six carbon atoms, alkoxycarbonyl, acylamino, and dialkylaminoethoxycarbonyl.

4,959,388

FUNGICIDAL COMPOSITION WITH SYNERGISTIC ACTIVITY

Thomas Wilde, Berlin, Fed. Rep. of Germany, assignor to Schering Aktiengesellschaft, Fed. Rep. of Germany

Division of Ser. No. 287,902, Dec. 21, 1988, Pat. No. 4,937,261. This application Mar. 7, 1990, Ser. No. 490,153

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3744053

Int. Cl.[5] A01N *37/34, 42/10*

U.S. Cl. 514—479 **4 Claims**

1. A fungicidal composition comprising a synergistic effective amount of the mixture of

(A) propyl 3-(dimethylamino)propylcarbamate or an acid addition salt thereof, and

(B) tetrachloroisophthalonitrile (chlorothalonil) and a carrier, wherein the ratio of component A to component B is from about 1:0.1 to 3.

4,959,389

PHARMACEUTICAL PREPARATION FOR THE TREATMENT OF PSORIATIC ARTHRITIS

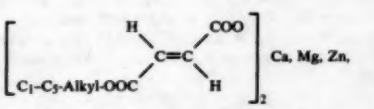
Peter P. Speiser, Freudenbergstrasse 101/D2, and Rajendra K. Joshi, Badenerstrasse 795, both of 8044 Zürich, Switzerland

Filed Oct. 19, 1987, Ser. No. 109,780

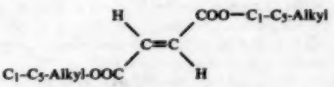
Int. Cl.[5] A61K *31/315, 31/225*

U.S. Cl. 514—494 **2 Claims**

1. A pharmaceutical composition for the treatment of psoriasis and psoriatic anthritis consisting essentially of a mixture of 10–250 parts by weight of the calcium, 1–50 parts by weight of the magnesium, and 1–50 parts by weight of the zinc salts of fumaric acid monoalkylesters of the general formula



in which C_1–C_5-alkyl stands for straight chain and branched-chain alkyl groups having from 1 to 5 carbon atoms, admixed with 250-10 parts by weight of a dialkylfumarate of the formula



in which C_1–C_5-alkyl has the meaning indicated above, the total weight of active substances not exceeding 300 mg per dosage form.

4,959,390

POLYHYDROXYBENZYLOXYPROPANOLAMINES

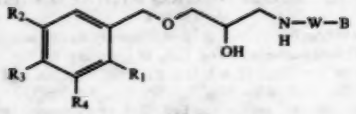
Ghanshyam Patil, Vernon Hills, Ill.; William L. Matier, Hockessin, Del., and Khuong H. X. Mai, Chatworth, Calif., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 15, 1988, Ser. No. 285,005

Int. Cl.[5] A61K *31/275*; C07C *255/50*

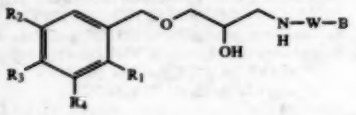
U.S. Cl. 514—522 **12 Claims**

1. A compound of the formula



wherein R_1 may be alkyl of from 1 to about 6 carbon atoms, alkenyl of from 2 to about 6 carbon atoms, alkynyl of from 2 to about 10 carbon atoms, cycloalkyl of from 3 to about 8 carbon atoms, halo, acetamido, amino, nitro, alkylamino of from 1 to about 6 carbon atoms, hydroxy, hydroxyalkyl of from 1 to about 6 carbon atoms, or cyano, R_2, R_3 and R_4 are hydrogen or hydroxyl or the combination of either hydrogen or hydroxyl; W represents alkylene of from 1 to about 10 carbon atoms; and B represents hydrogen; or a pharmaceutically acceptable salt thereof.

5. A method of treating cardiac disorders in a patient comprising administering to a patient in need of such treatment a therapeutically effective amount of a compound of the formula



wherein R_1 may be alkyl of from 1 to about 6 carbon atoms, alkenyl of from 2 to about 6 carbon atoms, alkynyl of from 2 to about 10 carbon atoms, cycloalkyl of from 3 to about 8 carbon atoms, halo, acetamido, amino, nitro, alkylamino of from 1 to about 6 carbon atoms, hydroxy, hydroxyalkyl of from 1 to about 6 carbon atoms, or cyano, R_2, R_3 and R_4 are hydrogen or hydroxyl or the combination of either hydrogen or hydroxyl; W represents alkylene of from 1 to about 10 carbon atoms; and B represents hydrogen; or a pharmaceutically acceptable salt thereof.

4,959,391

PHENOL DERIVATIVES, PHARMACEUTICAL COMPOSITIONS CONTAINING THESE COMPOUNDS AND PROCESSES FOR THE PREPARATION OF THESE COMPOUNDS AND COMPOSITIONS

Oswald K. Zimmer, Dueren; Werner P. Vollenberg, Stolberg; Gerriet K. H. Loschen, Stolberg; Werner Winter, Aachen; Erwin O. Kiesewetter, Stolberg, and Ulrich G. P. Seipp, Aachen, all of Fed. Rep. of Germany, assignors to Gruenenthal GmbH, Stolberg, Fed. Rep. of Germany

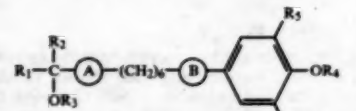
Continuation-in-part of Ser. No. 862,649, May 13, 1986, Pat. No. 4,760,087. This application Jul. 14, 1988, Ser. No. 218,981

Claims priority, application Fed. Rep. of Germany, May 24, 1985, 3518655

Int. Cl.[5] C07C 57/42, 69/108

U.S. Cl. 514—546 **18 Claims**

1. A compound corresponding to the formula



wherein

A and B have the same or different meanings and each represents one of the groups —C≡C—, cis—CH=CH— or trans—CH=CH—, with the proviso that A and B may not both be a —C≡C— group,

R_1 is

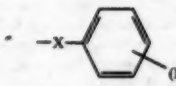
hydrogen, or

a straight chain alkyl raidcal containing 1 to 6 carbon atoms, or

a 5 to 7 membered cycloalkyl group, or

a group of the formula $—(CH_2)_m—O—R_7$, wherein m is a number 1, 2 or 3 and R_7 represents methyl or ethyl, or

a group of the formula



in which X is a bond, a $—CH_2—$group or a $—CH_2O—$ group, R_8 is a hydrogen, fluorine or a chlorine atom or a methyl, methoxy or trifluoromethyl group and n represents a number 1 or 2,

R_2 is hydrogen, methyl or ethyl,

R_3 is hydrogen or an acetyl or a propionyl group,

R_4 is hydrogen, an acetyl or a propionyl group,

R_5 is a hydroxy, acetyloxy or propionyloxy group or an alkoxy group OR_9 wherein R_9 is a straight chain or branched alkyl radical containing 1 to 4 carbon atoms, and

R6 represents hydrogen, a hydroxy, acetyloxy or propionyloxy group, an alkyl group R_9 or an alkoxy group or OR_9 wherein R_9 has the meaning given above.

4,959,392

METHOD OF TREATING DIABETES MELLITUS

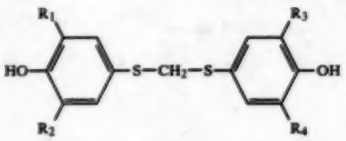
Keith M. Robinson, Glendale; Simon J. T. Mao, Loveland, and Richard L. Jackson, Cincinnati, all of Ohio, assignors to Merrell Dow Pharmaceuticals Inc., Cincinnati, Ohio

Filed Jul. 24, 1989, Ser. No. 384,571

Int. Cl.[5] A61K 31/10

U.S. Cl. 514—712 **3 Claims**

1. A method of lowering blood glucose in a patient afflicted with diabetes mellitus comprising administering to said patient an effective blood glucose lowering amount of a compound of the formula



wherein R_1, R_2, R_3 and R_4 are each independently a C_1–C_6 alkyl group.

4,959,393

SKIN DEPIGMENTAL AGENT

Masahiro Torihara, Kurashiki; Yoshio Tamai, Shibata; Manzo Shiono, and Kenji Tasaka, both of Okayama, all of Japan, assignors to Kuraray Company, Ltd., Kurashiki, Japan

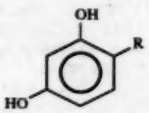
Filed Apr. 27, 1989, Ser. No. 343,571

Claims priority, application Japan, May 9, 1988, 63-113286

Int. Cl.[5] A61K 31/045

U.S. Cl. 514—724 **6 Claims**

1. A skin depigmental composition, comprising a skin depigmenting effective amount of a resorcinol of the formula (I)



(I)

wherein R is a linear alkyl group having from 2–12 carbon atoms or a linear alkyl group having from 2–12 carbon atoms in which a hydrogen atom on the linear alkyl group is substituted by a methyl group, and a cosmetic base.

4,959,394

NOVEL GUANIDINIUM ASPARTATES

Gerhard Baschang, Bettingen, and Alfred Sallman, Bottmingen, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

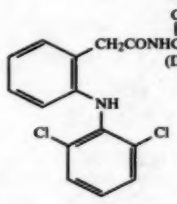
Continuation of Ser. No. 353,160, May 15, 1989, abandoned, which is a continuation of Ser. No. 70,290, Jul. 6, 1987, abandoned. This application Nov. 17, 1989, Ser. No. 437,329

Claims priority, application Switzerland, Jul. 11, 1986, 2795/86-1

Int. Cl.[5] A61K *31/205*

U.S. Cl. 514—555 **12 Claims**

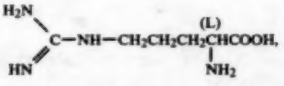
1. The L-arginine salt of N-(D [2-(2,6-dichlorophenylamino)phenyl]acetyl}aspartic acid, of the formula



(I)

(D)

in which AmH ⊕ represents the cation of L-arginine Am of the formula



(II)

(L)

3. Pharmaceutical preparations containing a compound according to claim 1 together with pharmaceutically acceptable adjuncts.

4,959,395

BULK POLYMERIZED MOLDED PRODUCTS CONTAINING CYCLOOLEFIN MONOMENTS WITH MICROENCAPSULATED BLOWING AGENTS

Dennis J. Janda, Parma, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Continuation of Ser. No. 425,610, Oct. 23, 1989, abandoned, which is a division of Ser. No. 304,215, Jan. 31, 1989, abandoned, which is a continuation-in-part of Ser. No. 212,703, Jun. 28, 1988, abandoned. This application Feb. 21, 1990, Ser. No. 483,300

Int. Cl.[5] C08J *9/22*

U.S. Cl. 521—54 **19 Claims**

1. A solid molded article which comprises polymers obtained by bulk ring-opened polymerization of cycloolefin monomers having a norbornene functional group and having dispersed within these polymers expanded microspheres comprised of

a synthetic thermoplastic resin shell having a softening point at a temperature below 180° C. that encapsulates a liquid blowing agent when unexpanded, said synthetic thermoplastic shell being substantially impermeable to said liquid blowing agent.

4,959,396

COMPOSITION FOR MICROPOROUS SEPARATORS AND METHOD FOR ITS PREPARATION

Lyuben K. Yankov; Stefka K. Filipova; Ivo Y. Zlatanov, and Evgeni B. Budevski, all of Sofia, Bulgaria, assignors to Centralen Institute Po Chimitcheska Promishlenost, Sofia, Bulgaria

Continuation of Ser. No. 131,148, Dec. 10, 1987, abandoned. This application Jan. 23, 1990, Ser. No. 469,699

Int. Cl.[5] B01D *39/20;* **C08K** *3/36;* **C08L** *23/02;* **H01M** *2/16*

U.S. Cl. 521—61 **8 Claims**

1. A composition for preparing microporous separators comprising 5 to 60 wt % of a polyolefin; 10 to 60 wt % of a filler consisting of SiO_2 having a particle size smaller than 20 microns a specific surface greater than 175 m@/g and an oil adsorption greater than 150g/100: 10 to 75 wt. % of a plasticizer and 0.2 to 20 wt. % of an ethoxysiloxane.

4,959,397

SOFT AND LOW-DENSITY FOAM MATERIALS FROM MODIFIED COPOLYMERS OF ETHYLENE WITH VINYL ACETATE AND/OR ALKYL ESTERS OF ACRYLIC OR METHACRYLIC ACID

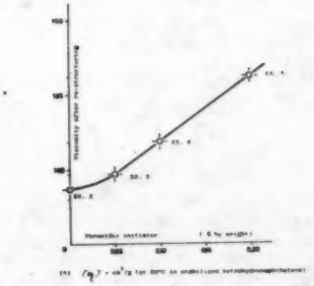
Corrado Brichta, Milan; Annibale Vezzoli, Carugo, and Angelo Borghi, Gerenzano, all of Italy, assignors to Montedipe S.p.A., Milan, Italy

Continuation of Ser. No. 208,861, Jun. 14, 1988, abandoned, which is a continuation of Ser. No. 863,044, May 14, 1986, abandoned. This application Apr. 13, 1989, Ser. No. 338,369

Claims priority, application Italy, May 15, 1985, 20729 A85

Int. Cl.[5] C08J *9/14*

U.S. Cl. 521—96 **6 Claims**



1. Soft and low-density non-crosslinked foam materials from copolymers of ethylene with vinyl acetate and/or alkyl esters of acrylic or methacrylic acid, comprising:

the copolymers are at least partially re-structured, in a selective way, substantially showing the particular fused structures (II) and/or (III), namely oxalic and/or succinic bridges at a temperature between 120° and 200° C. in the presence of from 0.05 to 0.5 by weight of a radical initiator;

the amount of co-monomer, with the copolymers, ranges from 5 to 30% by weight;

the copolymers contain an amount of non-hydrolyzable gel substantially null and anyway lower than 5% by weight;

the MFI index of the foams is not greater than 1.1 g/10′ (at 2.16 Kg and 190° C.).

4,959,398

POWDERY ADHESIVE AND PROCESS FOR PREPARATION THEREOF

Koichiro Oka, Ibaraki, and Ikuo Hagiwara, Ohtsu, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 310,171
Int. Cl.[5] C08L 63/10
U.S. Cl. 523—400 23 Claims

1. A powdery adhesive comprised of spherical particles comprising 40 to 90 parts by weight of an epoxy resin component and 10 to 60 parts by weight of a rubber component, said spherical particles containing up to about 15 parts by weight of a latent curing agent for the epoxy resin component per 100 parts of the total weight of the epoxy resin component and the rubber component, wherein the average particle size of the particles is from 0.1 to 500 μm.

4,959,399

ACIDIC ADHESION PROMOTERS FOR PVC PLASTISOLS

Truc-Chi Huynh-Tran, Bartonsville, Md., assignor to W. R. Grace & Co.-Conn., New York, N.Y.

Filed May 20, 1988, Ser. No. 196,703
Int. Cl.[5] C08L 27/06, 63/00; C08K 5/20, 5/3415
U.S. Cl. 523—437 11 Claims

1. Composition comprising:

(i) poly(vinyl chloride) homopolymer or copolymer, in an amount of from about 5 to 200 parts by weight.

(ii) plasticizer, in an amount of from about 1 to 400 parts by weight.

(iii) epoxy resin, in an amount o: from about 1 to 400 parts by weight, selected from the group consisting of:

(a) bisphenol-A epoxy resin diluted with about 15 wt. % C_{12}–C_{14} aliphatic glycidyl ether,

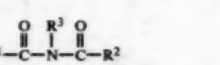
(b) cycloaliphatic epoxy resins, and

(c) epoxidized linseed oil;

(iv) anhydride, in an amount of from about 0.1 to 200 parts by weight, selected from the group consisting of maleic anhydride, 1,2,4,5 benzenetetra-carboxylic dianhydride, succinic anhydride, or polyadipic polyanhydride;

(v) filler, in an amount of from about 0 to 500 parts by weight; and

(vi) an inide, in an amount of from about 0.1 to 300 parts by weight, of the structure



wherein R^1 and R^2 are independently aliphatic, cycloaliphatic, or aromatic or may be joined in a ring and R^3 can be —H, —OH, alkyl (1–4 carbons), vinyl or alkali metal.

2. Composition according to claim 1, comprising

(i) poly(vinyl chloride) homopolymer or copolymer, 15–70 parts;

(ii) plasticizer, 15–80 parts;

(iii) epoxy resin, 3–60 parts;

(iv) anhydride, 0.1–30 parts;

(v) filler, 30–90 parts; and

(vi) imide, 0.1–70 parts.

4. Composition according to claim 2, comprising maleic anhydride, about 1.7 weight percent; succinimide, about 5 weight percent; polyadipic polyanhydride, about 0.3 weight percent; a bisphenol-A epoxy resin diluted with 5–20 weight percent of a C_{12}–C_{14} aliphatic glycidyl ether, about 3 weight percent; diisodecyl phthalate, about 28 weight percent; poly(-vinyl chloride) copolymer with 5 weight percent vinyl acetate, about 10 weight percent; poly(vinyl chloride) homopolymer, about 8 weight percent; calcium oxide, about 2.8 weight percent; and calcium carbonate, 40 weight percent.

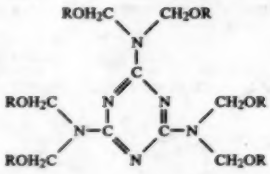
4,959,400

RESIN COMPOSITION COMPRISING A POLYHYDRIC PHENOLIC HARDENER

Diane Sexton, Lauf, Fed. Rep. of Germany, assignor to The Dow Chemical Company, Midland, Mich.

Continuation of Ser. No. 92,029, Sep. 1, 1987, abandoned, which is a division of Ser. No. 892,022, Jul. 30, 1986, Pat. No. 4,713,137. This application Aug. 24, 1989, Ser. No. 398,337
Claims priority, application United Kingdom, Jul. 31, 1985, 85 19290
Int. Cl.[5] C08K 3/32; C08L 63/00
U.S. Cl. 523—451 18 Claims

1. An epoxy resin composition comprising an epoxy resin possessing more than one 1,2-epoxy group, a polyhydric phenolic hardner, a volatile organic solvent for said epoxy resin and said hardner and an acid having a pKa of 2.5 or less at 25° C. or an ester or anhydride of such acid in an amount of from 0.01 to 2 weight percent based on the total weight of the epoxy resin composition, and said acid, ester or anhydride being selected from the group consisting of a phosphoric acid anhydride, dimethyl sulfate or monomethyl sulfate, alkyl, aryl, or aralkyl sulfonic acids, and alkyl, aryl or aralkyl sulfonates; wherein the hardner is the reaction product of one or more hexa-alkyl ethers of a hexamethylol melamines having the general formula:



wherein each R is individually an alkyl radical having from 1 to 4 carbon atoms with one or more polyhydric phenol, or one or more polyhydric phenols and one or more monohydric phenols; the hexa-alkyl ether of the hexamethylol melamine and phenol being reacted in an amount sufficient to provide more than one reactive phenolic hydroxyl group for each alkoxy group.

4,959,401

SYNTHETIC ROCK COMPOSITION OF MATTER AND METHOD OF PREPARATION

Jay G. Bellasalma, 3620 Calmbrook La., Diamond Bar, Calif. 91765, and Kenneth W. Lundrigan, 16337 Summershade Dr., La Mirada, Calif. 90638

Continuation of Ser. No. 80,962, Aug. 3, 1987, abandoned. This application Nov. 30, 1989, Ser. No. 443,025
Int. Cl.[5] C08K 3/00
U.S. Cl. 523—466 11 Claims

1. A composition of matter for use in making synthetic rock comprising:

an organic portion comprising one or more polymers selected from the group consisting of unsaturated polyesters, expoxies, phenolics and acrylics, wherein said polymer(s) comprise about 5–95% by weight of the organic portion;

an inorganic portion comprising particles formed by fusing a mixture 0.1 to 20 weight percent of a metal, 0.1 to 12 weight percent of oxide pigment, 0 to 90 weight percent of kaolin and a sufficient amount of first and second inorganic binders to provide fusing of said mixture when it is heated to a temperature of between about 1800° F. and 3000° F., wherein said first inorganic binder is feldspar and said second inorganic binder is silicon dioxide; and

wherein said inorganic portion is dispersed within the organic portion and is about 5 to 90 percent by weight of the organic portion.

4,959,402

HIGH CLARITY RADIATION STABLE POLYMERIC COMPOSTION AND ARTICLES THEREFROM

Joel L. Williams, Cary, and George R. Titus, Raleigh, both of N.C., assignors to Becton, Dickinson and Company, Franklin Lakes, N.J.

Filed Jun. 8, 1989, Ser. No. 362,999

The portion of the term of this patent subsequent to Jul. 4, 2006, has been disclaimed.

Int. Cl.[5] C08K 5/34, 5/15

U.S. Cl. 524—99 7 Claims

1. A composition comprising a polyolefin having a crystalline content of about 20 to 90 percent and a weight distribution wherein the ratio of the weight average molecular weight to the number average molecular weight is no greater than 6, a mobilizing amount of a liquid mobilizer compatible with said polyolefin having a density of about 0.6 to 1.9 grams per cubic centimeter, a radiation stabilizing amount of a hindered piperidine stabilizer and a clarifying amount of a dibenzylidene sorbitol alkyl thioether clarifier.

4,959,403

THERMOPLASTIC MOLDING COMPOSITIONS WITH COLD IMPACT STRENGTH

Martin Bartmann, Recklinghausen; Roland Feinauer, Marl; Uwe Hartkopf, Haltern, and Michael Schlobohm, Marl, all of Fed. Rep. of Germany, assignors to Huels Aktiengesellschaft, Marl, Fed. Rep. of Germany

Filed Oct. 24, 1988, Ser. No. 261,147

Claims priority, application Fed. Rep. of Germany, Jan. 28, 1988, 3805108

Int. Cl.[5] C08K 5/43

U.S. Cl. 524—169 5 Claims

1. A thermoplastic molding composition having good cold impact strength properties, consisting essentially of:

(I) a polyamide 1212 having a relative viscosity, as determined by a m-cresol solution (100 cm^3) containing 0.5 g PA 1212 at 25° C., in the range of from 1.5 to 3.0, and

(II) 2 to 25% by weight, based on the polyamide, of a plasticizer.

4,959,404

THERMOPLASTIC RESIN COMPOSITION

Toshio Nakane, Fuji; Yukihiko Kageyama, Fujinomiya, and Kenji Hijikata, Mishima, all of Japan, assignors to Polyplastics Co., Ltd., Osaka, Japan

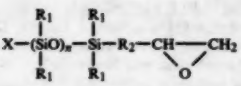
Filed Nov. 3, 1988, Ser. No. 266,800

Claims priority, application Japan, Dec. 4, 1987, 62-307198

Int. Cl.[5] C08K 5/54

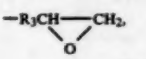
U.S. Cl. 524—267 4 Claims

1. A thermoplastic resin composition comprised of a homogeneous resin dispersion which comprises (A) a thermoplastic resin component having a solubility parameter of at least 9.5 $cal^{\frac{1}{2}}cm^{-3/2}$ and being at least one thermoplastic resin selected from the group consisting of polyester, polyamide, polyesteramide, polyurethane, polyvinyl chloride, polycarbonate, polyacetal, polyvinylidene chloride, polyacrylonitrile, polymethacrylonitrile, polymethyl acrylate, polyvinyl alcohol, cellulose and their derivatives, (B) a modifier component having a solubility parameter of not greater than 8.5 $cal^{\frac{1}{2}}cm^{-3/2}$ and being at least one polymer selected from the group consisting of homopolymers or copolymers of polytetrafluoroethylene, polyvinyldiene chloride, polychlorotrifluoroethylene, fluororubber, polyalkylsiloxane, polyphenylsiloxane, butyl rubber, polyisobutylene, polyethylene, ethylene/propylene rubber and polypropylene, and (C) a dispersibility improver, wherein said dispersibility improver is comprised of a silicon-containing polyacetal copolymer having (i) a siloxane segment derived from between 0.01 to 30 wt. % of a terminal-reactive silicone oil of the following general formula I:



(I)

wherein R_1 represents an alkyl or phenyl group, R_2 represents a divalent organic group, X represents a group selected from the group consisting of —NH_2, —OH,



—R_4OH, —R_5COOH, —R_6COOR_7, —R_8 and —OR_9, where R_3 represents a divalent organic group, R_4 to R_5 each represent an alkylene group having 1 to 10 carbon atoms, R_7 to R_9 each represent an alkyl group having 1 to 10 carbon atoms and n represents a number between 5 to 10, and

(ii) between 99.99 to 70 wt. % of polyacetal segment covalently bonded to said siloxane segment wherein the degree of polymerization of the siloxane segment is between 5 to 1,000, and the degree of polymerization of the polyacetal segment is between 5 to 2,000 and wherein the weight ratio of thermoplastic resin component to the modifier component is 99.9 to 85/0.1 to 15, and the amount of the dispersibility improver is between 0.01 to 5 parts by weight per 100 parts by weight in total of the thermoplastic resin component and the modifier component.

4,959,405

ACID MODIFIED ADHESIVE COMPOSITION

Paul C. Briggs, Charlestown, and Donald E. Gosiewski, Peabody, both of Mass., assignors to Illinois Tool Works, Inc.

Continuation of Ser. No. 135,012, Dec. 18, 1987, abandoned, which is a division of Ser. No. 870,710, Jun. 4, 1986, Pat. No. 4,714,730. This application Jun. 2, 1989, Ser. No. 361,749

Int. Cl.[5] C08K 5/09

U.S. Cl. 524—321 9 Claims

1. An adhesive composition comprising:

(a) an acrylate or methacrylate ester monomer;

(b) a polymerization catalyst;

(c) a mixture of

(A) one or more of the members of the group consisting of:

(1) chlorinated polyethylene polymer resin and sulfonyl chloride;

(2) chlorosulfonated polyethylene polymer resin; and

(3) a polymer-in-monomer solution and (B) a graft copolymer resin having a backbone polymer with a glass transition temperature substantially below ambient temperature and a grafted polymer resin having a glass transition temperature substantially above ambient temperature; and

(d) an effective amount of strong organic acid wherein the acid has a dissociation constant (K_d or K_1d) within the range of from about 1×10^{-2} to about 10×10^{-1} or wherein an 0.2 N aqueous solution of the acid has a pH in the range of from about 1.2 to 2.0 at 2.5° C.

4,959,406

LASER-WRITABLE MATERIAL

Eckard Foltin, Sinzig-Bodendorf; Hans-Werner Depcik, Duesseldorf; Karl Huff, Dormagen; Alfred Pischtschan, Kuerten; Mehmet C. Yesildag, Leverkusen, and Reiner Erkelenz, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 6, 1989, Ser. No. 306,677

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1988, 3805056

Int. Cl.[5] C08K *3/04, 3/22, 7/14*

U.S. Cl. 524—413 3 Claims

1. A composition which comprises

(i) a plastic material,

(ii) 0.001 to 2.2% by weight of TiO_2,

(iii) no more than 0.1% by weight of carbon black having an average particle diameter of from 30 to 120 nm, and

(iv) 0.01 to 20% by weight of a tracking resistance reducing additive which is a halogen-containing compound, an antimony compound, a hydroxide or glass fibers,

wherein said plastic material comprises polyethylene, polypropylene, polyisobutylene, polystyrene, polyvinyl chloride, polyvinylidene chloride, polyvinyl acetates, polyacrylonitrile, polyacrylates, polymethacrylates, polybutadiene, copolybutadiene, ABS plastics, ethylene-vinyl acetate copolymers, high-molecular-weight esters of aromatic polycarboxylic acids with polyfunctional alcohols, polyamides, polyimides, polyamideimides, liquid crystal polymers, aromatic polycarbonates, polyurethanes, polyethers, polyphenylene sulphides, polyacetates, products of the condensation of formaldehyde with phenols, products of the condensation of formaldehyde with urea, thiourea and melamine aminoplastics, epoxy resins, polyphenols, alkyd resins, maleate resins or mixtures thereof.

4,959,407

RTV SILICONES HAVING BIS(UREIDO)SILANE CHAIN EXTENDERS AND AMINOXY SILOXANE CROSSLINKERS

Jonathan D. Rich, Rexford; David C. Gross; Timothy B. Burnell, both of Schenectady, and Jeffrey H. Wengrovius, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 1, 1989, Ser. No. 359,818

Int. Cl.[5] C08K *3/26*

U.S. Cl. 524—425 21 Claims

1. Solventless, moisture curable, room temperature vulcanizable organopolysiloxane compositions, comprising by weight,

(A) 100 parts of a silanol-terminated polydiorganosiloxane,

(B) 2.5 to 25 parts, of a bis(ureido)diorganosilicon coupler selected from the class consisting of diorganosilanes and ureido-chain-stopped polydiorganosiloxanes having an average of from 1 to 10 condensed diorganosiloxy units,

(C) 0.25 to 10 parts of an aminoxyorganosiloxane crosslinker selected from the class consisting of a cyclic siloxane, linear siloxane, and mixture thereof, having from 2 to about 100 silicon atoms substituted with $C_{(1-13)}$ monovalent

organic radicals and from 3 to about 10-OY radicals attached to silicon by silicon-oxygen linkages, where there are less than 3-OY radicals per silicon atom, Y is a monovalent amine radical selected from the class consisting of $N(R)_2$ and a heterocyclic amine, and R is selected from the same or different $C_{(1-13)}$ monovalent organic radicals, and

(D) up to 400 parts of a non-siliceous filler comprising a mixture of ground calcium carbonate and 10% to 100% by weight thereof of precipitated calcium carbonate.

4,959,408

POLY(METHYL METHACRYLATE) BLENDED WITH A SOLID POLY(BUTYL ACRYLATE-CO-ALLYL ACRYLATE) PLASTICIZER

Frank O. Grant, 2600 Windy Hill Dr. Pepper Pike, Ohio, 44124 43560

Filed Nov. 9, 1988, Ser. No. 269,432

Int. Cl.[5] C08L *33/12, 33/08*

U.S. Cl. 524—523 16 Claims

1. A composition of matter comprising a miscible physical blend of homopoly(methyl methacrylate) and a linear rubber copolymer consisting essentially of polymerized moieties of butyl acrylate and allyl acrylate, said copolymer being soluble in methyl ethyl ketone, said miscibility being evidenced in that the physical blend has no glass transition temperature equal to or greater than said homopoly(methyl methacrylate) and said blend showing a decrease in the impact strength of said homopoly(methyl methacrylate).

4,959,409

AMINO-FUNCTIONAL COMPOUNDS AS BUILDER/DISPERSANTS IN DETERGENT COMPOSITIONS

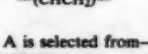
Stephen W. Heinzman, Cincinnati; Michael J. Eis, West Chester, and Molly P. Armstrong, Cincinnati, all of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 14, 1988, Ser. No. 144,823

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—61 5 Claims

1. A random copolymer especially adapted for use as a dispersant in laundry detergent compositions, said random copolymer having a molecular weight in the range from about 635 to about 50,000 and comprising from about 0.10 to about 0.95 mole fraction of repeat units of the formula



wherein M is sodium, A is selected from—OC(O)C(L)HCH-2(O)C—, —OC(O)CH_2C(L)H(O)C—and mixtures thereof and L is selected from the group consisting of aspartate, glutamate, glycinate, ethanolamino, β-alanate, taurine, aminoethylsulfate, alanate, sarcosinate, N-methylenthanolamino, iminodiacetate, 6-aminohexanoate, Nmethylaspartate and diethanolamino; wherein said random copolymer is produced by a process comprising

(i) reacting a polyvinyl alcohol with maleic anhydride to produce a butenedioate half-ester of said polyvinyl alcohol; and

(ii) reacting said butenedioate half-ester with an amine reactant selected from the group consisting of aspartic acid, glutamic acid, glycine, β-alanine, ethanolamino, taurine, aminoethylsulfate, alanine, sarcosine, N-methylethanolamine, iminodiacetic acid, 6-aminohexanoic acid, N-methylaspartic acid and diethanolamine;

provided that in step (ii), the alkalinity is controlled by means of a carbonate-buffered reaction medium.

4,959,410

POLYMER MIXTURES HAVING HIGH TENSILE STRENGTH AND GOOD TEAR PROPAGATION RESISTANCE

Herbert Eichenauer; Edgar Leitz, both of Dormagen; Karl-Heinz Ott, Leverkusen; Christian Lindner, Cologne; Lothar Meier, Spockhoevel, and Otto Billinger, Rhein, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Mar. 6, 1989, Ser. No. 318,972

Claims priority, application Fed. Rep. of Germany, Mar. 17, 1988, 3808843

Int. Cl.[5] **C08L** *69/00, 55/02, 51/04, 35/00*

U.S. Cl. 525—67 **4 Claims**

1. Polymer mixtures having high tensile strength and good tear propagation resistance comprising

(A) from 10 to 95 parts by weight of a graft polymer of from 40 to 85% by weight of a particulate, highly cross-linked diene- or alkylacrylate-rubber and from 60 to 15% by weight of graft polymerised alkylacrylates, alkylmethacrylates, acrylonitrile, methacrylonitrile, styrene, styrene-substituted in the nucleus, α-methylstyrene, maleic acid anhydride, N-substituted maleimide, vinyl acetate and mixtures thereof.

(B) from 0 to 75 parts by weight of a thermoplastic polymer of alkylacrylates, alkylmethacrylates, acrylonitrile, methacrylonitrile, styrene, α-methylstyrene or mixtures thereof, and

(C) from 5 to 60 parts by weight of a copolymer having a sequential structure corresponding to the idealized formula (I)

$$(A—X—B)_n \qquad (I)$$

wherein

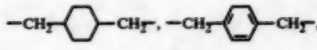
n=1 to 20 and

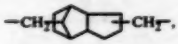
A=a polymer of a cyclic carbonate corresponding to formula (II) ("Block A")

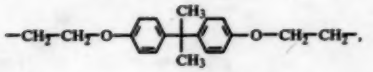
(II)

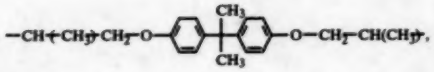
wherein

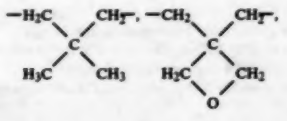
R^1=—$(CH_2)_n$— wherein n=3–12, —$CH_2CH_2CH(CH_3)$—, —$CH_2CH_2OCH_2CH_2$—, —$CH_2CH_2OCH_2CH_2OCH_2CH_2$—, —$CH_2CH(CH_3)CH_2CH_2C(CH_3)_2CH_2$—,











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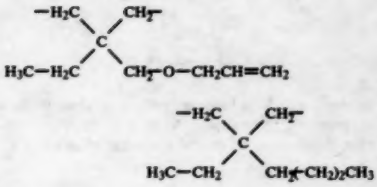
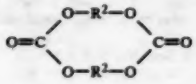


or corresponding to formula (III)

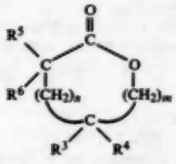


(III)

wherein

R^2=—$(CH_2)_n$ wherein n=4–12, —$CH_2CH_2OCH_2CH_2$— —$CH_2CH_2OCH_2CH_2OCH_2CH_2$—

B=a polymer of a cyclic ester corresponding to formula (IV) ("Block B")



(IV)

wherein

R^3, R^4, R^5, R^6=H, C_1–C_6-alkyl, C_3–C_6-alkenyl, C_1–C_6-alkoxy or C_1–C_6-alkenoxy-C_1–C_6-alkyl, in particular H, CH_3 or C_2H_5 and

m and n denote, independently of one another, 0, 1, 2, 3, 4, 5 or 6, and

X=the middle member containing both the cyclic carbonate corresponding to formula (II) or (III) or both and the cyclic ester corresponding to formula (IV) in polymerised form, the concentration of the structural units of compounds (II) or (III) or both continuously decreasing in the direction of —B— and the concentration of the structural units of compounds (IV) continuously decreasing in the direction of —A— ("tapered structure") and the proportion of blocks A amounting to from 1 to 45% by weight, based on the total quantity of blocks (A+B), the proportion of blocks B amounting from 99 to 55% by weight, based on the total quantity of blocks (A+B) and the proportion of middle members X amounting to from 5 to 95% by weight, based on the total quantity of A+B+X.

4,959,411

PREPARATION OF COPOLYMER FROM CARBOXY-FUNCTIONALIZED POLYCARBONATE AND NUCLEOPHILIC POLYMER

Ronald J. Gambale, Clifton Park; Susan J. Hathaway, Albany; Kathryn L. Longley, Saratoga Springs, and Timothy J. Ullman, Niskayuna, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

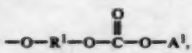
Division of Ser. No. 109,873, Oct. 19, 1987, Pat. No. 4,853,458. This application Dec. 27, 1988, Ser. No. 289,860

Int. Cl.[5] **C08G** *64/42*

U.S. Cl. 525—67 **10 Claims**

1. A method for forming a copolymer which comprises effecting reaction between an amine-terminated polyamide or

epoxy-functionalized olefin polymer and a carboxy-functionalized polycarbonate containing end groups of the formula



(I)

wherein each R^1 is independently a divalent aliphatic, alicyclic or aromatic radical and A^1 is a carboxylic acid-substituted phenyl group or a functional derivative thereof.

4,959,412

HIGH SHEAR TACKIFIER RESINS

William J. Arter, Goshen; Wayne K. Chu, Tarrytown, both of N.Y.; Erwin R. Ruckel, Wilton, Conn., and Roland P. F. Scharrer, Pelham, N.Y., assignors to Arizona Chemical Company, Panama City, Fla.

Filed Feb. 27, 1989, Ser. No. 316,237

Int. Cl.[5] C08L *25/04, 25/06, 53/02*

U.S. Cl. 525—98 **11 Claims**

1. A method for the preparation of an adhesive with an improved high temperature shear strength comprising the steps of:

blending from about 10 weight percent to about 25 weight percent of a styrene homopolymer with from about 90 weight percent to about 75 weight percent of a tackifier resin and forming a resin blend; and

combining an effective amount of the resin blend with a block copolymer thermoplastic elastomer with at least one styrene domain and forming an adhesive.

4,959,413

CROSSLINKABLE POLYMERS

Jeffrey D. Umpleby, Princeton, N.J., assignor to BP Chemicals Limited, London, England

PCT No. PCT/GB88/00448, § 371 Date Jan. 27, 1989, § 102(e) Date Jan. 27, 1989

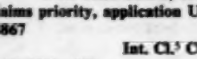
PCT Filed Jun. 8, 1988, Ser. No. 312,590

Claims priority, application United Kingdom, Jun. 13, 1987, 8713867

Int. Cl.[5] C08F *8/00*

U.S. Cl. 525—100 **10 Claims**

1. A crosslinkable polymer comprising an organic polymer, and pendant substituents having the general formula:



wherein the nitrogen atom N is connected to a carbon atom in the organic polymer,

Q is a hydrogen atom or represents an additional connection to a carbon atom present in the organic polymer,

X is a divalent hydrocarbyl group having one to six carbon atoms,

m is zero or one and

R is an alkyl group containing one to twenty carbon atoms.

4,959,414

COMPOSITION COMPRISING CHLOROSULFONATED ETHYLENE COPOLYMER, EPOXY RESIN AND DIMALEIMIDE

Tatsushi Nakagawa; Yoshiaki Ishida; Junichiro Kaneseka, and Yosuke Kaneshige, all of Yamaguchi, Japan, assignors to Tosoh Corporation, Yamaguchi, Japan

Filed Mar. 18, 1988, Ser. No. 169,720

Claims priority, application Japan, Aug. 11, 1987, 62-199047

Int. Cl.[5] C08L *23/34*

U.S. Cl. 525—11 **7 Claims**

1. A chlorosulfonated ethylene-α-olefin copolymer composition for rubber belts comprising

(a) 100 parts by weight of a chlorosulfonated ethylene-α-olefin copolymer containing from 25 to 32% by weight chlorine and from 0.3 to 2.5% by weight sulfur,

(b) from 1 to 4 parts by weight of a metal oxide or a metal hydroxide,

(c) from 3 to 15 parts by weight of an epoxy compound selected from bisphenol A epoxy resins and phenol-novolak epoxy resins,

(d) from 0.5 to 5 parts by weight of a thiuram, and

(e) from 0.5 to 5 parts by weight of a dimaleimide.

4,959,415

THERMOPLASTIC MOLDING MATERIALS BASED ON POLYPHENYLENE ETHERS, NYLONS AND STYRENE COPOLYMERS

Christof Taubitz, Wachenheim; Erhard Seiler, Ludwigshafen; Juergen Hambrecht, Muenster-Hiltrup; Konrad Mitalla, Ludwigshafen, and Klaus Boehlke, Hessheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 2,237, Jan. 12, 1987, abandoned. This application Apr. 11, 1988, Ser. No. 179,991

Claims priority, application Fed. Rep. of Germany, Jan. 21, 1986, 3601581; Jun. 7, 1986, 3619224

Int. Cl.[5] C08L *71/04*

U.S. Cl. 525—133 **5 Claims**

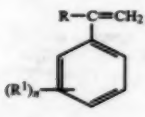
1. A thermoplastic molding material comprising:

(A) not less than 5% by weight of polyphenylene ether,

(B) not less than 5% by weight of a nylon, and

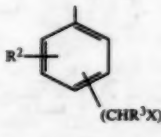
(C) not less than 0.1% by weight of a rubber-free copolymer composed of

(C_1) from 80 to 99.95% by weight of a styrene of the formula



wherein R and R^1 are alkyl of 1 to 8 carbon atoms, hydrogen, halogen, or mixtures thereof, and n is 0, 1, 2 or 3,

(C_3) from 0.05 to 20% by weight of a halobenzyl-containing monomer copolymerizable with C_1, and possessing the structural unit



where X is halogen, R^2 and R^3 are each alkyl of 1 to 8 carbon atoms or hydrogen, and n is 1, 2 or 3, and

(C_3) from 0 to 10% by weight of acrylonitrile, methacrylonitrile or a mixture thereof, and

(D) from 0 to 35% by weight of a an impact-modifying rubber.

4,959,416

POLYMERIC BLEND COMPOSITION

Yun C. Sun, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 45,748, May 4, 1987, abandoned, which is a continuation-in-part of Ser. No. 809,360, Dec. 16, 1985, abandoned. This application May 15, 1989, Ser. No. 352,622

Int. Cl.[5] C08L 27/08, 35/02

U.S. Cl. 525—222 10 Claims

1. A polymeric blend composition comprising a visually homogeneous blend of

(a) from about 45 to about 98 weight percent, based on total blend composition weight, of a vinylidene chloride interpolymer having polymerized therein vinylidene chloride in an amount of from about 40 to about 98 percent by weight of interpolymer and at least one monoethylenically unsaturated monomer copolymerizable therewith in an amount of from about 60 to about 2 percent by weight of interpolymer;

(b) from about 2 to about 70 weight percent, based on total blend composition weight, of a copolymer which is miscible with the vinylidene chloride interpolymer, said copolymer comprising a monovinylidene aromatic monomer and methyl methacrylate, said copolymer having polymerized therein a monovinylidene aromatic monomer in an amount of from about 20 to about 80 percent by weight of copolymer and a methyl methacrylate in an amount of 80 to about 20 percent by weight of copolymer, wherein the monovinylidene aromatic monomer and methyl methacrylate are each present in an amount effective for the copolymer and the vinylidene chloride interpolymer to be substantially miscible; and

(c) from 0 to about 50 weight percent, based on total blend composition weight of a polymer formed from one or more monovinylidene aromatic monomers.

4,959,417

COMPOSITE ACRYLIC RESIN PARTICLES

Tadafumi Miyazono, Osaka, and Shinichi Ishikura, Kyoto, both of Japan, assignors to Nippon Paint Co., Ltd., Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 189,133

Claims priority, application Japan, Apr. 22, 1987, 62-99440

Int. Cl.[5] C08F 30/04, 275/00

U.S. Cl. 525—274 6 Claims

1. Composite acrylic resin particles each comprising a particulate metal-containing crosslinked acrylic polymer in which the metal constitutes part of the crosslinked acrylic polymer structure, to which metal-containing crosslinked acrylic structure, a number of substantially linear acrylic polymer chains are chemically bonded, prepared by a combination of steps of effecting an emulsion polymerization of a monomer mixture of:

(A) at least one crosslinking monomer having in its molecule two or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds, or a combination of at least two monomers each having a mutually reactive functional group and one or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds,

(B) at least on mono-functional polymerizable monomer other than aromatic compounds and metal-containing monomer hereinunder defined,

(C) at least one metal-containing monomer, and

(D) at least one monomer having in its molecule one or more radically polymerizable mono- or 1,1-di-substituted ethylenic unsaturation bonds and one or more radically polymerizable 1,2-, 1,1,2-tri- or 1,1,2,2-tetra-substituted ethylenic unsaturation bonds, to obtain an emulsion of metal-containing crosslinked polymer particles on which radically polymerizable 1,2-di-, 1,1,2-tri- or 1,1,2,2-tetra-substituted ethylenic unsaturation bonds still remain therein, and effecting a graft-polymerization of said polymer particles with a polymerizable aromatic compound together with other optional mono-functional polymerizable monomers.

4,959,418

POLYMERS IN PARTICLE FORM WITH IMPROVED PROPERTIES, FOR THE PREPARATION OF THERMOPLASTIC MOULDING MATERIALS

Christian Lindner, Cologne; Karl-Heinz Ott, Leverkusen; Dieter Wittmann, Krefeld, and Hans-Eberhard Braese, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Aug. 18, 1986, Ser. No. 897,348

Claims priority, application Fed. Rep. of Germany, Aug. 29, 1985, 3530818

Int. Cl.[5] C08F 265/04, 265/06, 265/10

U.S. Cl. 525—282 19 Claims

1. A particulate polymer consisting essentially of 90 to 99% by weight of a particulate core having a resin surface selected from a homo- or copolymer of resin forming monomers or a graft polymer comprising

(a) a diene, olefin, alkyl acrylate rubber or mixtures thereof core and

(b) a homo- or copolymer of resin-forming monomers shell and 10 to 1% by weight of a rubber-like homo- or copolymer, with a glass transition temperature of less than 30° C., graft polymerized onto the resin surface.

4,959,419

POLYMERIC EMULSIFIERS BASED ON AMINOTELECHELIC OLIGOMERS I

Adolf Schmidt, Cologne; Udo W. Hendricks, Odenthal; Bruno Bömer, Bergisch Gladbach; Karl H. Ott, Leverkusen; Herbert Eichenauer, Dormagen, and Alfred Pischtschan, Kürten-Eichhof, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Dec. 16, 1987, Ser. No. 133,517

Claims priority, application Fed. Rep. of Germany, Dec. 20, 1986, 3643792

Int. Cl.[5] C08F 8/46, 8/42

U.S. Cl. 525—301 3 Claims

1. Polycarboxylic acid salts corresponding to the following general formula

$$X\left(-NHCO-Y-COO^{\ominus}\right)_n \; nM^{\oplus}$$

in which

X represents the residue of a hydrophobic, linear or branched vinyl oligomer having an average molecular weight $\overline{M}_n$ of from 200 to 5000,

Y is the 1,2-vinylene, 1,2-ethylene, 1,3-propylene, 1,2-phenylene, 1,2-cyclohexene-4-ylene or 1,2-cyclohexylene group,

n is a number of from 1.4 to 3.0,

M represents an alkali metal, an ammonium, C_1–C_4 alkylammonium or C_2–C_3 hydroxyalkylammonium group.

4,959,420

CHLORINATED EPDM WITH SUPERIOR STABILITY

Stephen C. Davis, Bright's Grove; Janet B. Fulton, Sarnia, and Peter P. M. Hoang, Clearwater, all of Canada, assignors to Polysar Limited, Sarnia, Canada

Filed Nov. 1, 1989, Ser. No. 430,010

Int. Cl.[5] C08F 8/22

U.S. Cl. 525—331.7 11 Claims

1. A chlorinated ethylene-alpha olefin-nonconjugated diolefin terpolymer characterized by superior stability on storage or exposure to elevated temperatures having a chlorine content of from about 0.5 to 14 percent by weight based on the weight of said chlorinated terpolymer wherein the base ethylene-alpha olefin-nonconjugated diolefin terpolymer comprises:

(i) about 40 to 80 mol percent ethylene,

(ii) about 20 to 60 mol percent of a C_3 to C_8 alpha olefin, and

(iii) about 0.5 to 10 mol percent of a C_7 to C_{16} nonconjugated

diolefin characterized in that it is an acyclic nonconjugated diolefin wherein one olefinic bond is monosubstituted and terminal and the other olefinic bond is trisubstituted.

4,959,421

COPOLYMERIZED POLYESTER HAVING EXCELLENT TRANSPARENCY AND GAS BARRIER PROPERTIES

Takuji Hirahara, Kawasaki, Japan; Masahiro Nukui, Delden, Netherlands, and Katsuji Tanaka, Machida, Japan, assignors to Mitsubishi Kasei Corporation, Tokyo, Japan

Filed Mar. 24, 1989, Ser. No. 328,517

Claims priority, application Japan, Mar. 26, 1988, 63-72199; Mar. 29, 1988, 63-73422; Mar. 29, 1988, 63-73423; Sep. 20, 1988, 63-235181

Int. Cl.[5] C08G 63/66

U.S. Cl. 525—437 **2 Claims**

1. A polyester composition comprising:

(i) a copolymerized polyester produced by copolymerizing a dicarboxylic acid component (A) comprising

(a) 10 to 90 mol % of isophthalic acid or an ester forming derivative thereof,

(b) 10 to 60 mol % of a phenylenedi(oxyacetic acid) represented by the formula [I]:

[I]

(wherein R^1, R^2, R^3 and R^4 each represent a hydrogen atom, an alkyl group having 1 to 6 carbon atoms, an alkoxy group having 1 to 6 carbon atoms, a phenyl group, a chlorine atom, a bromine atom or a fluorine atom), or an ester forming derivative thereof; and

(c) 0 to 45 mol % of a naphthalenedicarboxylic acid or an ester forming derivative thereof, and a diol component (B); and

(ii) a polyester containing polyethylene terephthalate as the main constituent.

4,959,422

POLY EPOXY BRANCHED POLYCARBONATE AND METHOD FOR PREPARATION

Ronald J. Gambale, Croton-on-Hudson, and Timothy J. Ulman, Voorheesville, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 15, 1989, Ser. No. 407,978

Int. Cl.[5] C08G 64/42

U.S. Cl. 525—463 **20 Claims**

1. A method for preparing a branched polycarbonate which comprises effecting reaction between at least one linear carboxylic acid-terminated polycarbonate and an amount effective for branching of at least one polyepoxy compound.

4,959,423

NUCLEATING AGENTS FOR POLY(ARYL ETHER KETONES)

James E. Harris, Piscataway, and Paul A. Winslow, Millington, both of N.J., assignors to Amoco Corporation, Chicago, Ill.

Continuation-in-part of Ser. No. 40,300, Apr. 20, 1987, abandoned. This application May 9, 1988, Ser. No. 191,325

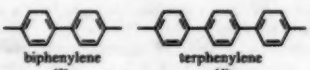
Int. Cl.[5] C08L 61/00, 71/00, 79/08

U.S. Cl. 525—471 **8 Claims**

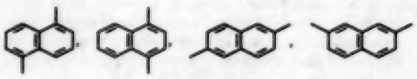
1. A poly(aryl ether ketone) composition having increased crystallization rates comprising:

(a) at least 98 percent by weight of a poly(aryl ether ketone) having a melting point no more than about 390° C., and further comprising ether groups joined to keto groups through 1,4-phenylene groups, with the proviso that where two keto groups are attached to the same phenylene ring, up to 50 percent of the keto groups can be in position meta with respect to each other; and

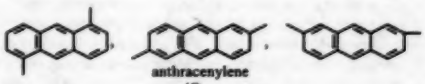
(b) 2 percent or less by weight of a second poly(aryl ether ketone) having a melting point higher than about 400° C., and further comprising (i) either groups joined to keto groups through 1,4-phenylene groups and (ii) at least one member selected from the group consisting of:



biphenylene (3) terphenylene (4)



naphthylene, and (5)



anthracenylene (6)

with the proviso that where two keto groups are attached to the same phenylene ring, up to 50 percent of the keto groups can be in position meta with respect to each other.

4,959,424

AMINO-TERMINATED POLY(ARYL ETHER KETONES)

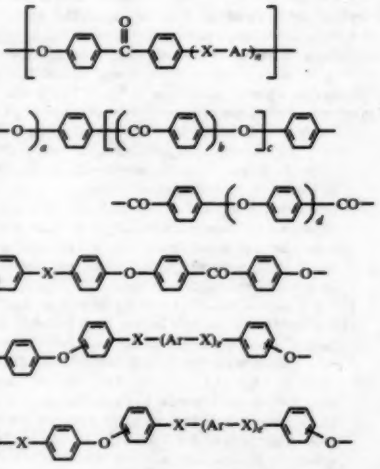
Markus Matzner, Edison, N.J., and Donald M. Papuga, Ridgefield, Conn., assignors to Amoco Corporation, Chicago, Ill.

Filed Jul. 25, 1986, Ser. No. 889,203

Int. Cl.[5] C08G 65/00, 10/00, 16/00

U.S. Cl. 525—471 **10 Claims**

1. A process for the preparation of a diamino-terminated poly(aryl ether ketone) which consists of repeating units of one or more of the following formulae:



wherein Ar is independently a divalent aromatic radical se-

lected from phenylene, biphenylene or naphthylene, X is independently 0,

or a direct bond and n is an integer of from 0 to 3, b, c, d, and e are 0 to 1 and a is an integer of 1 to 4 which comprises reacting a corresponding dihalo-terminated oligomer with ammonia or a primary amine, in suspension or in solution at a temperature in a range from about 200° to about 350° C. in the presence of a catalyst which is a copper salt.

4,959,425

LAMINATING VARNISH COMPOSITION CONTAINING A DIFUNCTIONAL EPOXY RESIN, A POLYFUNCTIONAL EPOXY RESIN, A DIFUNCTIONAL PHENOL AND A POLYFUNCTIONAL PHENOL AND A SOLVENT

Louis L. Walker, Clute, and Paul A. Larson, Lake Jackson, both of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 121,329, Nov. 16, 1987, Pat. No. 4,868,059. This application Jun. 27, 1989, Ser. No. 372,581

Int. Cl.[5] C08G *59/08, 59/32;* **C08L** *63/04*

U.S. Cl. 525—482 **6 Claims**

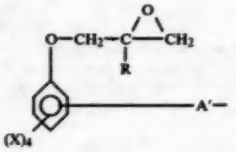
1. A laminating varnish composition comprising a substantially unreacted mixture of

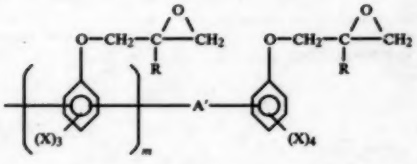
(A) an epoxy-containing composition consisting essentially of

(1) from about 5 to about 95 percent by weight of at least one epoxy resin having an average of not more than 2 vicinal epoxide groups per molecules; and

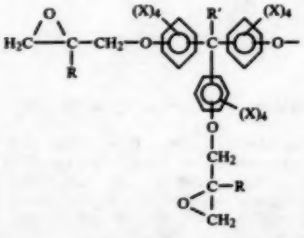
(2) from about 95 to about 5 percent by weight of at least one epoxy resin having an average of more than 2 vicinal epoxide groups per molecule, at least one such epoxy resin being represented by the following formulas III; or IV:

Formula III





Formula IV



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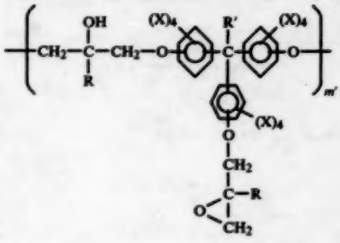
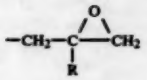




wherein each A′ is independently a divalent hydrocarbyl group having from 1 to about 4 carbon atoms; each R is independently hydrogen or an alkyl group having from 1 to about 3 carbon atoms; each R′ is independently hydrogen or a hydrocarbyl group having from 1 to about 5 carbon atoms; each X is independently hydrogen, an alkyl group having from 1 to about 5 carbon atoms or a halogen; m has a value from about 1 to about 4; and m′ has a value from zero to about 1;

(B) a phenolic hydroxyl-containing composition consisting essentially of

(1) from about 10 to about 70 equivalent percent about at least one phenolic hydroxyl-containing compound having an average of not more than 2 phenolic hydroxyl groups per molecules; and

(2) from about 90 to about 30 equivalent percent of at least one phenolic hydroxyl-containing compound having an average of more than 2 phenolic hydroxyl groups per molecule; and wherein components (A) and (B) are present in quantities which provide a ratio of phenolic hydroxyl groups for each epoxy group of from about 0.75:1 to about 1.2:1;

(C) a catalytic quantity of at least one catalyst for effecting the reaction between components (A) and (B); and

(D) one or more solvents in an amount up to about 75 percent by weight of the total composition.

4,959,426

EPOXY RESINS PREPARED BY CO-CURING FLUORINATED EPOXY PREPOLYMERS AND NON-FLUORINATED EPOXY PREPOLYMERS

Alberto Re, Milan, and Marco De Giorgi, Varese, both of Italy, assignors to Ausimont S.r.l., Milan, Italy

Continuation-in-part of Ser. No. 130,937, Dec. 10, 1987, abandoned. This application Nov. 3, 1988, Ser. No. 267,733

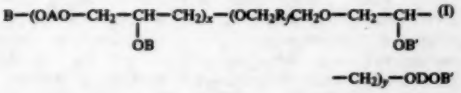
Claims priority, application Italy, Dec. 16, 1986, 22696 A/86

Int. Cl.[5] C08L *63/02, 63/04, 63/06*

U.S. Cl. 525—527 **3 Claims**

1. A cross-linked epoxy fluorinated resin containing from 1% to 30% by weight of fluorine, prepared by co-curing, by means of known cross-linking agents suitable for epoxy resins, a mixture of:

(a) an epoxy prepolymer containing fluoro-alkylene or perfluoropolyether blocks of the formula:

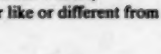


where:

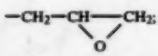
x is an integer from 0 to 20; and

y is an integer from 0 to 20;

B and B', either like or different from each other, are H or



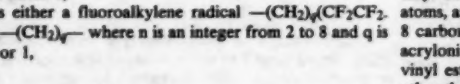
at least one of them being



A is a radical of a fluorinated diol containing one or more aromatic rings;

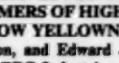
D=—$CH_2R_fCH_2$— and may be also A when y is different from 0;

R_f is either a fluoroalkylene radical —$(CH_2)_q(CF_2CF_2)_n$—$(CH_2)_q$— where n is an integer from 2 to 8 and q is 0 or 1,



where n=2–8, q=0 or 1, p=1–8 and m=1–8 or a perfluoropolyether radical containing sequences of fluorooxyalkylene units selected from the and consisting of:

—CF_2CF_2O—, —CF_2O—, —$OCF_2CF_2CH_2$—, —$CF(CF_3)O$—and



wherein the units having index x and y can be in random distribution in the chain;

and of:

(b) a non-fluorinated epoxy prepolymer having at least two epoxy groups per molecule obtained from epichlorohydrin and from a diol containing one or more aromatic rings.

4,959,427

CATALYST COMPONENT FOR POLYMERIZATION OF OLEFINS

Hiroyuki Furuhashi; Tadashi Yamamoto; Masafumi Imai, and Hiroshi Ueno, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan

Division of Ser. No. 761,240, Jul. 31, 1985, Pat. No. 4,613,579. This application May 12, 1986, Ser. No. 861,814

Claims priority, application Japan, Jul. 31, 1984, 59-159118

Int. Cl.[5] C08F *4/654, 10/00*

U.S. Cl. 526—142 **2 Claims**

1. A process for the homopolymerization of an olefin or the copolymerization of an olefin with another olefin, said process comprising polymerizing the olefin(s) in the presence of a catalyst system comprising (A) a titanium-containing supported catalyst component comprising the product obtained by contacting (1) a reaction product of (a) a dihydrocarbyl magnesium compound, mixtures thereof or a complex with an organic compound of aluminum, boron, beryllium, or zinc, and (b) a chlorine-containing alcohol with (2) a di-, tri- or tetravalent titanium compound, and (B) an organo metallic compound of Groups I through III.

4,959,428

EMULSION POLYMERIZATION PROCESS

Tadashi Abe; Masahiro Aoki, and Takeo Tsukamoto, all of Mie, Japan, assignors to Mitsubishi Yuka Badische Company, Ltd., Yokkaichi, Japan

Filed Aug. 17, 1988, Ser. No. 233,127

Claims priority, application Japan, Aug. 17, 1987, 62-203187

Int. Cl.[5] C08F *2/22;* **526** *201, 304, 315, 316*

U.S. Cl. 526—201 **9 Claims**

1. An emulsion polymerization process comprising: (A) employing as a dispersant a water soluble copolymer obtained by adding an alkali to a carbonyl group-containing copolymer, which comprises (a) 0.5 to 27 by weight of a carbonyl group-containing monomer unit having at least one aldehyde or keto group and a polymerizable double bond per molecule; (b) 2 to 28.5% by weight of a monoolefinically unsaturated carboxylic acid unit having 3 to 5 carbon atoms; (c) 71 to 97% by weight of a monomer unit selected from the group consisting of an alkyl acrylate an alkyl moiety of which has 1 to 8 carbon atoms, an alkyl methacrylate an alkyl moiety of which has 1 to 8 carbon atoms, a vinyl aromatic compound, a vinyl halide, acrylonitrile, methacrylonitrile and a saturated carboxylic acid vinyl ester; and (d)-0 to 10% by weight of a monomer unit other than those as defined in (a) to (c), with the total amount of the monomer units as defined in (a) to (d) being 100% by weight to thereby water-solubilize the same and (B) emulsion-polymerizing, including copolymerizing, unsaturated monomer(s) having polymerizable double bond(s).

4,959,429

CYCLOHEXENIC ADDITIVES FOR PRODUCING POLYCARBONATE POLYMERS OF HIGH REFRACTIVE INDEX AND LOW YELLOWNESS

Michael S. Misura, Barberton, and Edward J. Sare, Clinton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 832,555, Feb. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 801,166, Nov. 22, 1985, abandoned. This application May 19, 1988, Ser. No. 196,861

The portion of the term of this patent subsequent to May 9, 2006, has been disclaimed.

Int. Cl.[5] C08F *4/36, 12/30, 18/24*

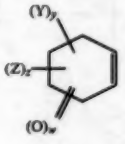
U.S. Cl. 526—230.5 **38 Claims**

1. A polymerizable, homogeneous composition comprising:

(a) bisphenol bis(allylic carbonate)-functional material comprising (i) bisphenol bis(allylic carbonate)-functional monomer, (ii) prepolymer of said monomer, or (iii) a mixture thereof; and

(b) a yellowness reducing amount of cyclohexenic material which is a cyclohexenic compound or a mixture of such cyclohexenic compounds;

wherein said cyclohexenic material comprises at least one cyclohexenic compound represented by the formula:



in which

(c) each Y is independently alkyl containing from 1 to about 4 carbon atoms;

(d) Z is hydroxyl, 2-oxoethyl, alkoxycarbonyl containing from 2 to about 5 carbon atoms, or $R_3C(O)OR_4$- in which R_3 is alkyl containing from 1 to about 4 carbon atoms and R_4 is alkanediyl containing from 2 to about 4 carbon atoms or alkylidene containing from 1 to about 5 carbon atoms;

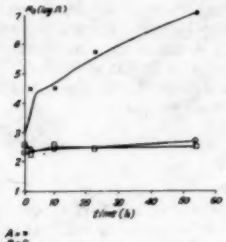
(e) y is an integer in the range of from 0 to about 3;

(f) z is 0 or 1;
(g) w is 0 or 1; and
(h) the sum of z and w is 0 or 1.

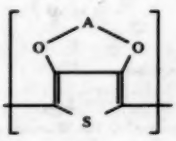
4,959,430
POLYTHIOPHENES, PROCESS FOR THEIR PREPARATION AND THEIR USE

Friedrich Jonas, Aachen; Gerhard Heywang, Bergisch Gladbach; Werner Schmidtberg, Leverkusen; Jürgen Heinze, and Michael Dietrich, both of Freiburg, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Apr. 13, 1989, Ser. No. 337,498
Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813589; Dec. 23, 1988, 3843412
Int. Cl.[5] C08F *28/06*
U.S. Cl. 526—257 **4 Claims**



1. A polythiophene containing structural units of the formula



(I)

in which

A is an C_1–C_4-alkylene radical or a substituted C_1–C_4-alkylene radical.

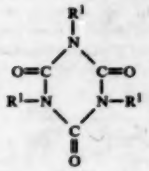
4,959,431
OPTICAL MATERIAL

Nobuhiro Watanabe, Matsudo, and Teruo Sakagami, Tokyo, both of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Japan

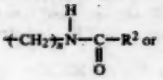
Filed Nov. 14, 1988, Ser. No. 270,802
Claims priority, application Japan, Dec. 8, 1987, 62-308516; Dec. 8, 1987, 62-308517
Int. Cl.[5] C08F *26/06*
U.S. Cl. 526—261 **7 Claims**

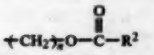
1. An optical material comprising a copolymer obtained by polymerizing a monomer composition composed of at least 30 parts by weight of Component A, which comprises a trifunctional monomer represented by the following formula [A], and at most 70 parts by weight of a monomer copolymerizable with Component A;

Formula [A]

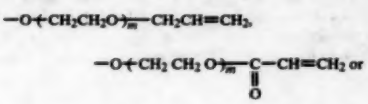


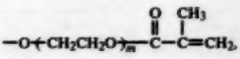
wherein R^1 means





in which n is an integer of 2–8 and R^2 is a radically-polymerizable functional group represented by





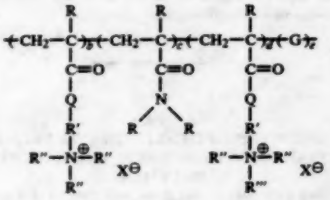
m being an integer of 0–2.

4,959,432
ACID VISCOSIFIER COMPOSITIONS

You-Ling Fan, East Brunswick; George L. Brode, Bridgewater, and James P. Stanley, Bound Brook, all of N.J., assignors to Union Carbide Chemicals and Plastics Company Inc., Danbury, Conn.

Continuation of Ser. No. 864,204, May 19, 1986, abandoned. This application Jul. 18, 1988, Ser. No. 220,784
Int. Cl.[5] C08F *220/34, 220/60*
U.S. Cl. 526—287 **7 Claims**

1. A cationic polymer of the formula:



wherein:

R=H or CH_3;

R′=a linear or branched alkylene radical having from 2 to 4 carbon atoms;

R″=H, CH_3 or CH_2CH_3;

R‴=an alkyl group, linear or branched, having from 8 to about 18 carbon atoms;

Q=—NR— or —O—;

G=a residual unit derived from a polyunsaturated monomer;
$X^{\ominus}$=a halogen ion (F, Cl, Br, I) or an alkyl sulfate ion;
b=from about 30 to about 50 mole percent;
c=from about 50 to about 70 mole percent;
d=from 0.1 to about 2 mole percent; and
e=from 0 to 0.5 mole percent.

4,959,433

PARTIALLY POLYMERIZED BIS(ALLYLIC CARBONATE) MONOMER HAVING HIGH ALLYLIC UTILIZATION

Stephanie J. Oates, Wadsworth, and Edward J. Sare, Clinton, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 840,264, Mar. 17, 1986, abandoned. This application Mar. 12, 1987, Ser. No. 24,878
Int. Cl.[5] C08F *18/24*
U.S. Cl. 526—314 14 Claims

1. A polymerizable, liquid, substantially gel-free, partially polymerized monomer composition wherein
(a) the monomer which has been partially polymerized is bis(allylic carbonate) monomer of at least one 4,4'-(alkylidene)bis[phenol], bis(allylic carbonate) monomer of at least one 4,4'-[phenylenebis(alkylidene)]-bis[phenol], or a mixture thereof, and
(b) the allylic utilization of said composition is greater than 50 percent.

4,959,434

MODIFIED IMPACT-RESISTANT VINYLAROMATIC COPOLYMERS

Gianfranco Biglione, Mantova, and Savino Matarrese, Verona, both of Italy, assignors to Montedison S.p.A., Milan, Italy

Continuation of Ser. No. 747,223, Jun. 21, 1985, abandoned. This application Dec. 28, 1989, Ser. No. 455,762
Claims priority, application Italy, Jun. 22, 1984, 21560 A/84
Int. Cl.[5] C08F *220/44*
U.S. Cl. 526—342 2 Claims

1. An impact-resistant styrene copolymer containing from 2 to 8% by weight of an ethylenically unsaturated nitrile and from 8 to 30% by weight of alphamethylstyrene and having a gel content higher than 23%, a cracking resistance, in an oil-/oleic acid mixture in a 50/50 ratio by weight and under a load of 10 MPa higher than 100 minutes, a melt index 200° C./5 kg) lower than 1.5 g/10 minutes and obtained by polymerization carried out in the absence of lubricating oils.

4,959,435

ORIENTED OPTICALLY TRANSPARENT CRYSTALLINE SYNDIOTATIC VINYLAROMATIC POLYMER

Jerry T. Seitz; Charles A. Berglund, and Andrew J. Pasztor, Jr., all of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich. and The Dow Chemical Company, Midland, Mich.

Division of Ser. No. 132,126, Feb. 4, 1988, Pat. No. 4,824,629. This application Apr. 24, 1989, Ser. No. 341,870
Int. Cl.[5] C08F *12/08, 12/06*
U.S. Cl. 526—347.2 5 Claims

1. An oriented, optically transparent, crystalline, syndiotactic, vinylaromatic polymer.

4,959,436

NARROW MWD ALPHA-OLEFIN COPOLYMERS

Charles Cozewith, Westfield; Shiaw Ju, Edison, and Gary W. Verstrate, Matawan, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 745,873, Jun. 17, 1985, Pat. No. 4,792,595, which is a division of Ser. No. 504,582, Jun. 15, 1983, Pat. No. 4,540,753. This application Jun. 27, 1988, Ser. No. 212,279
The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.
Int. Cl.[5] C08F *10/00*
U.S. Cl. 526—348 84 Claims

1. Copolymer of ethylene and at least one other alpha-olefin monomer, said copolymer having an average ethylene composition and comprising intramolecularly hetergeneous copolymer chains wherein at least two portions of an individual intramolecularly hetergeneous chain, each portion comprising at least 5 weight percent of said chain, differ in composition from one another by at least 5 weight percent ethylene, wherein said copolymer has an intermolecular compositional dispersity such that 95 weight percent of said copolymer chains have a composition 15 weight percent or less different from said average ethylene composition, and wherein said copolymer has a weight average molecular weight of from about 2,000 to about 12,000,000, and a MWD characterized by at least one of a ratio of $\overline{M}_z/\overline{M}_n$ of less than 2 and a ratio of $\overline{M}_z/\overline{M}_w$ of less than 1.8.

4,959,437

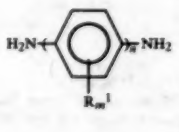
PROCESSES FOR PRODUCING A LOW THERMALLY EXPANSIVE AND HIGHLY ADHESIVE SILICON-CONTAINING POLYIMIDE AND A PRECURSOR THEREOF

Kouichi Kunimune, Ichiharashi; Yoshiya Kutsuzawa, Yokohamashi, and Shiro Konotsune, Yokosukashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

Filed Jun. 1, 1988, Ser. No. 200,894
Claims priority, application Japan, Jun. 29, 1987, 62-162018
Int. Cl.[5] C08G *77/26, 73/10*; B05D *3/02*; B32B *27/28*
U.S. Cl. 528—26 7 Claims

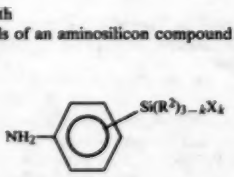
1. A process for producing a silicon-containing polyamic acid having an inherent viscosity of 0.05 to 5 dl/g as measured in a solvent of N-methyl-2-pyrrolidone in a concentration of 0.5 g/dl at 30°±0.01° C., which process comprises reacting
(1) anhydrides consisting of $-A^1$ mols of pyromellitic acid dianhydride (hereinafter abbreviated to PMDA) and $-A^2$ mols of 3,3',4,4'-biphenyltetracarboxylic acid dianhydride (hereinafter abbreviated to BPDA) with
(2) B mols of a diamine having the formula

(I)



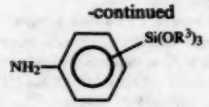
and with
(3) C mols of an aminosilicon compound selected from the group

(II)



and

-continued



(VI)

wherein R^3 represents a methyl group or an ethyl group and

-wherein in (2) and (3)

R^1 represents a methyl, ethyl, methoxy or ethoxy group or a halogen atom,

R^2 represents an alkyl group of 1–6 carbon atoms a phenyl group or a phenyl group substituted by an alkyl group of 7–12 carbon atoms,

X represents a hydrolyzable alkoxy group, an acetoxy group or a halogen atom,

m represents 0, 1 or 2;

n represents 1 or 2; and k represents 1, 2 or 3,

the amounts of said reactants being present in quantities to satisfy the expressions:

$$0.1 \leq \frac{A^2}{A^1 + A^2} \leq 0.95 \quad \text{(III)}$$

and

$$0.05 \leq \frac{C}{B + C} \quad \text{(IV)}$$

said silicon-containing polyamic acid having the property that when a solution of said acid in N-methyl-2-pyrrolidone is coated onto a polyester film by means of a coater, followed by drying the resulting film in a dryer at 100° C. for one hour to remove most of the solvent to thereby form a film thereon, stripping off this film from said polyester film, fixing the stripped off film at its periphery by means of two iron plates and baking it at 200° C. for one hour and successively at 350° C. for one hour, then a polyimide film having about 40 μm thick and an average thermal expansion coefficient at 30° C. to 450° C. of 0.8 to 1.8×10^{-5} deg $^{-1}$ is obtained.

4,959,438

EPOXY RESIN COMPOSITION AND PREPREG FOR COMPOSITE MATERIALS USING THE SAME FROM BI AND TRI-EPOXIDES, TRIARYLBISPHENOLS AND DIAMINODIPHENYLSULFONES

Hisashi Tada; Akira Agata, both of Aichi; Masahiro Saruta, Hiroshima, and Takashi Murata, Aichi, all of Japan, assignors to Mitsubishi Rayon Company, Ltd., Tokyo, Japan

Filed Jan. 27, 1989, Ser. No. 302,199

Claims priority, application Japan, Jan. 29, 1988, 63-18779

Int. Cl.[5] C08G *59/56, 59/62*

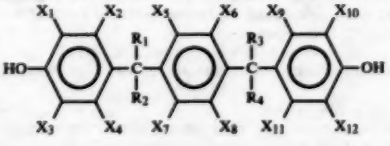
U.S. Cl. 528—98 **22 Claims**

1. An epoxy resin composition which comprises the following elements:

(A) a bifunctional epoxy resin;

(B) a trifunctional epoxy resin;

(C) a phenolic compound represented by the following general formula:



wherein X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, R_1, R_2, R_3 and R_4, which may be the same or different, each represents a hydrogen atom or a methyl group; and

(D) 4,4'-diaminodiphenyl sulfone or 3,3'-diaminodiphenyl sulfone, wherein the molar ratio of epoxy groups in element (A) to those in element (B) is in the range of from 1/4.0 to 0.1, element (C) is used in an amount that satisfies the condition:

$$1/0.9 \leq (A+B)/C \leq 1/0.1$$

and element (D) is used in an amount that satisfies the condition:

$$1/1.3 \leq (A+B-C)/D \leq 1/0.8$$

wherein A represents the number of epoxy groups by moles in element (A), B represents the number of epoxy groups by moles in element (B), C represents the number of phenolic hydroxyl groups by moles in element (C), and D represents the number of NH groups by moles in element (D).

4,959,439

METHOD OF MAKING PIEZOELECTRIC POLYMER USING POLYTETRAMETHYLENE OXIDE DI-P-AMINOBENZOATE

Katsumi Tanino, and Morihito Nakada, both of Toyama, Japan, assignors to Toyokako Kabushiki Kaisha, Namerikawa, Japan

Division of Ser. No. 208,063, Jun. 17, 1988, Pat. No. 4,921,928.

This application Feb. 27, 1990, Ser. No. 485,456

Claims priority, application Japan, Sep. 7, 1987, 62-223722

Int. Cl.[5] C08G *59/50, 59/52*

U.S. Cl. 528—111 **5 Claims**

1. A method for making a piezoelectric polymer material which comprises mixing suitable amounts of (1) an epoxy resin having at least two epoxy groups (2) a compound having at least two amino groups, at least two benzene rings, at least two carbonyl groups and at least 52 methylene groups and having a molecular weight of not less than 1200, and (3) a crosslinking agent made of an imidazole derivative and a pyridine derivative, subjecting the mixture to thermal curing by crosslinkage to form micro crystals therein, applying the resulting cured product with an electric field to cause dipolar orientation in the product, and freezing the oriented dipoles formed in the product.

4,959,440

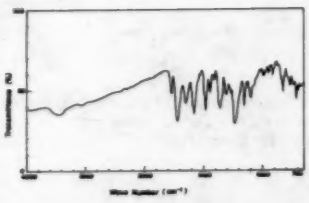
POLYIMIDE FOR HIGH-TEMPERATURE ADHESIVE

Shoji Tamai, Yokohama; Saburo Kawashima, Yokosuka; Yoshiho Sonobe, Yokohama; Masahiro Ohta, Yokohama; Hideaki Oikawa, Yokohama, and Akihiro Yamaguchi, Kamakura, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

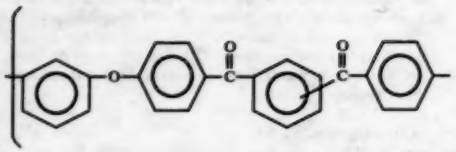
Filed Jan. 23, 1987, Ser. No. 6,513

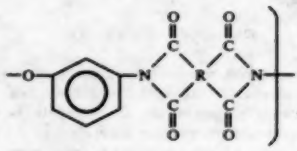
Int. Cl.[5] C08G *8/02, 14/00*

U.S. Cl. 528—125 **9 Claims**



1. Polyimide consisting essentially of recurring units of the formula:





where the positions of two carbonyl radicals in a benzene ring are meta or para, and R is a tetravalent radical selected from the group consisting of an aliphatic radical having not less than two carbons, cyclo-aliphatic radical, monoaromatic radical, condensed polyaromatic radical, and non-condensed polyaromatic radical wherein aromatic radicals are mutually connected with a bond or a crosslinking function.

4,959,441

ALKENYLPHOSPHONIC AND -PHOSPHINIC ACID ESTERS, PROCESS FOR THEIR PREPARATION, HYDROGELS PRODUCED USING THEM, AND THEIR USE

Friedrich Engelhardt; Ulrich Riegel, both of Frankfurt; Joachim Gersdorf, Wiesbaden, and Hans-Jerg Kleiner, Kronberg, all of Fed. Rep. of Germany, assignors to Cassella Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

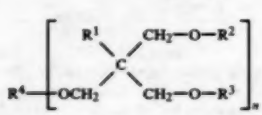
Filed May 8, 1989, Ser. No. 348,395

Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817425

Int. Cl.[5] C07F 9/02

U.S. Cl. 558—161 **2 Claims**

1. Compounds of the formula (I)

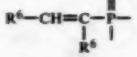


(I)

in which

n denotes 1 or 2

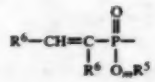
R^1 denotes alkyl having 1 to 4 carbon atoms, CH_2OH or CH_2OR^7 in which R^7 is as defined for R^2 or, when n is 1, R^2 is together with R^4, moiety of the formula (II)



(II)

in which R^6, independently of one another, denote hydrogen or alkyl having 1 to 4 carbon atoms,

R^2 denotes the formula (III)



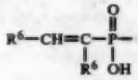
(III)

in which m denotes 0 or 1 and

R^5 denotes alkyl having 1 to 4 carbon atoms, where, if a compound of the formula I contains more than one of formula III, each R^5 is independent of one another,

R^3 denotes hydrogen or a moiety of formula (III), or R^2 and R^3 together form a moiety of formula (II),

where n is 1, R^4 denotes hydrogen, a moiety of formula (III) or, when R^1 represents alkyl having 1 to 4 carbon atoms and R^2 and R^3 together are a moiety of the formula (II), R^4 denotes a moiety of the general formula (IV)



(IV)

and, when n is 2, R^4 denotes a moiety of the formula (II).

4,959,442

PHOSPHAZENE ARTICLE AND PROCESS FOR PRODUCING THE SAME

Kazumi Ohkawa, Kashiwara; Toshitsugu Matsuki, Matsuyama, and Noritsugu Saiki, Matsuyama, all of Japan, assignors to Teijin Limited, Osaka, Japan

Continuation of Ser. No. 40,485, Apr. 20, 1987, abandoned. This application Oct. 12, 1989, Ser. No. 421,305

Int. Cl.[5] C08G 79/02

U.S. Cl. 528—168 **12 Claims**

1. A shaped polyphosphazene article comprising a polyphosphazene polymer having at least one type of repeating units of the formula

wherein R^1 and R^2 in the first and second side chains $—OR^1$ and OR^2 respectively represent, independently from each other, a member selected from aliphatic, cycloaliphatic and aromatic radicals; whereon on at least a portion of the surface of the article, the first and second side chains $—OR^1$ and $—OR^2$ in the polyphosphazene polymer located in the above-mentioned portion are converted, to an extent of at least 5 molar% thereof, to at least one type of third side chains of the formula $—OR^3$ in which R^3 represents a member selected from aliphatic, cycloaliphatic and aromatic radicals and which are different from the first and second side chains $—OR^1$ and $—OR^2$; and wherein only the surface portion of the shaped article is modified.

4,959,443

THERMOSETTING RESIN COMPOSITION FROM BIS MALEIMIDE AND AROMATIC AMINE RESIN

Norimasa Yamaya; Masahiro Ohta, and Akihiro Yamaguchi, all of Kanagawa, Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

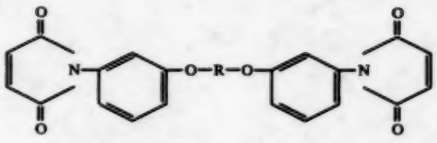
Filed May 15, 1989, Ser. No. 351,471

Claims priority, application Japan, May 17, 1988, 63-118363

Int. Cl.[5] C08L 33/24

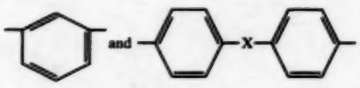
U.S. Cl. 528—170 **21 Claims**

1. A thermosetting resin composition comprising (i) about 100 parts by weight of a bismaleimide compound represented by the formula (I)



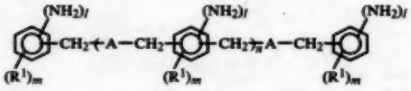
(I)

wherein R represents a divalent group selected from the group consisting of



wherein X is directly bonded to the benzene rings and is a group selected from the group consisting of a divalent hydrocarbon group having from 1 to 10 carbon atoms, an isopropylidene group having six fluorine atoms, a carbonyl group, a thio group, a sulfinyl group, a sulfonyl group and an oxo group,

and (ii) from about 5 to about 100 parts by weight of an aromatic amine resin represented by the formula (II)



(II)

wherein A represents a group selected from the group consisting of a phenylene group, an alkyl-substituted phenylene group, a diphenylene group, a diphenyl ether group and a naphthylenyl group; R^1 is selected from the group consisting of a halogen atom, a hydroxyl group, an alkoxy group having no greater than 4 carbon atoms, and an alkyl group having no greater than 5 carbon atoms; l is 1 to 2; m is an integer of from 0 to 3, and n is an integer of from 0 to 300.

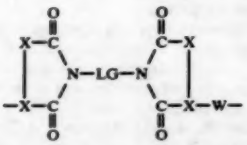
4,959,444

REACTION INJECTION MOLDABLE (RIM) THERMOSET POLYIMIDE, AND POLYKETONE ELASTOMERS

Charles M. Lewis, Springfield, Mo., and Nasser Pourahmady, Ridgeville, Ohio, assignors to Dayco Products, Inc., Dayton, Ohio

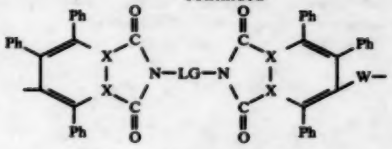
Filed Sep. 2, 1988, Ser. No. 241,168
Int. Cl.[5] C08G 79/00
U.S. Cl. 528—170 **27 Claims**

1. A polyimide having a repeating unit of the formula (I), (II), or (III):

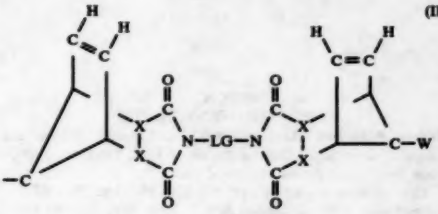


(I)

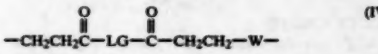
-continued



(II)



(III)



(IV)

where LG is a linking group and W is an oligomeric chain selected from the group consisting of polyether, a polythioether, a polyetherthioether, a polycarbonyl, a polysulfonyl, and copolymers thereof.

4,959,445

PREPARATION OF GRAY TO BLUE AROMATIC POLYESTERS BY INCORPORATION OF COBALT INTO THE CATALYST SYSTEM

Jerold C. Rosenfeld, Tonawanda, N.Y., assignor to Celanese Corporation, Chatham, N.J.

Continuation of Ser. No. 834,283, Feb. 25, 1986, abandoned. This application Jun. 30, 1987, Ser. No. 68,163
Int. Cl.[5] C08G 63/181
U.S. Cl. 528—181 **13 Claims**

1. In a method of preparing aromatic polyesters from a molten mixture comprising an aromatic dicarboxylic acid diester and a bisphenol by melt transesterification in the presence of an alkali metal-containing transesterification catalyst, the improvement which comprises adding a trace amount of a cobalt-containing compound to the molten mixture in addition to said catalyst and recovering a polyester of improved color.

4,959,446

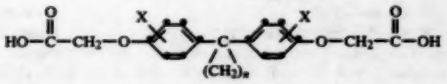
POLYAMIDE WITH IMPROVED GAS BARRIER PROPERTIES FROM CYCLO-ALKYLIDENE BISPHENOXY DIACETIC ACID

Burns Davis, deceased, late of Kingsport, Tenn. (by Bessie Anne Davis, executrix), and Theodore R. Walker, Jr., Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed May 26, 1989, Ser. No. 357,459
Int. Cl.[5] C08G 69/26
U.S. Cl. 528—185 **7 Claims**

1. A polyamide having an inherent viscosity of at least 0.5measured at 25 degrees C. in a 60/40 by weight mixture of phenol/tetrachloroethane at a concentration of 0.5 g/100 mL comprising the polyamide reaction product of

(A) a dicarboxylic acid corresponding to the structure



wherein X is hydrogen or unsubstituted alkyl containing 1–5 carbons and n is an integer in the range of 4 to 10, and (B) a diamine containing 5 to 16 carbon atoms.

4,959,447

COPOLY(IMIDINE-IMIDE)

Mitsuru Arai, San Marcos; Patrick E. Cassidy, Austin, and James M. Farley, League City, all of Tex., assignors to Nippon Steel Corporation, Tokyo, Japan

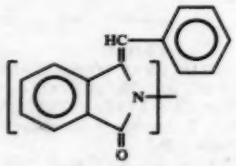
Continuation-in-part of Ser. No. 114,288, Oct. 29, 1987, abandoned. This application Sep. 2, 1988, Ser. No. 240,491

Int. Cl.[5] C08G *73/10, 73/14*

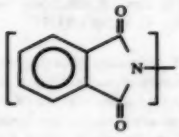
U.S. Cl. 528—188 **6 Claims**

1. A copoly(imidine-imide) comprising a copolymer of polyimidines and polyimides having, in the basic chain structure of the polymer, imidine structures represented by formula (I) and the imide structures represented by the formula (II):

[I]



[II]



4,959,448

LIQUID CRYSTALLINE SIDE-CHAIN POLYESTERS PREPARED BY POLYCONDENSATION REACTIONS

Carel T. J. Wreesmann, Arnhem, and Erwin W. P. Erdhuisen, Duiven, both of Netherlands, assignors to Akzo N.V., Netherlands

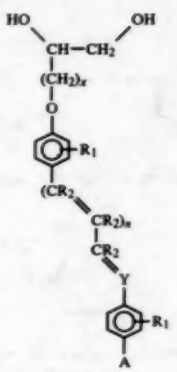
Filed Jun. 29, 1989, Ser. No. 373,373

Claims priority, application Netherlands, Jul. 4, 1988, 8801681

Int. Cl.[5] C08G *63/02, 63/60*

U.S. Cl. 528—192 **9 Claims**

1. A polyester comprised of the polyester polycondensation product of a diol and a reactant selected from the group consisting of (1) dicarboxylic acids and (2) derivatives thereof, said diol of the formula:



wherein

R_1 is halogen, R_2, OR_2, COR_2, $COOR_2$, CN[B] or CF_3;

R_2 is H or an alkyl group having 1–3 carbon atoms;

Y is CR_2, C—CN or N;

A is CN, NO_2, $CH{=}C(CN)_2$,

or CF_3;

n is 0–4; and

x is 0–6.

4,959,449

PROCESS FOR PREPARING LOW COLOR POLYARYLATES

Adin L. Stautzenberger; Edward E. Quick, both of Corpus Christi, Tex., and Peter F. Lobo, North Plainfield, N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed May 25, 1989, Ser. No. 356,692

Int. Cl.[5] C08G *63/00, 63/02*

U.S. Cl. 528—271 **40 Claims**

1. In a process for the production of polyarylates by reacting under esterification conditions a mixture of a diester of a dihydric phenol, at least one aromatic dicarboxylic acid and a non cobalt-containing polyesterification catalyst, the improvement which comprises: adding cobalt to the reaction mixture.

4,959,450

COPOLYESTERS FROM 4,4'BIPHENYLDICARBOXYLIC ACID, 1,4-CYCLOHEXANEDIMETHANOL AND 1,6-HEXANEDIOL

John C. Morris, and Winston J. Jackson, Jr., both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Dec. 23, 1988, Ser. No. 289,343

The portion of the term of this patent subsequent to Apr. 10, 2090, has been disclaimed.

Int. Cl.[5] C08G *63/02*

U.S. Cl. 528—272 **19 Claims**

1. A copolyester comprising

(A) an acid component comprising repeating units of at least 80 mol % 4,4'-biphenyldicarboxylic acid, and

(B) a glycol component comprising repeating units of from about 95–30 mol % 1,6-hexanediol, and about 5–70 mol % 1,4-cyclohexanedimethanol,

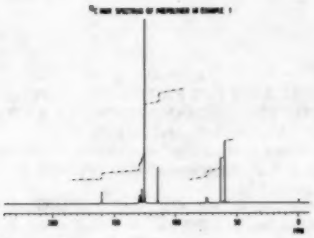
wherein the total mol % of acid component and glycol component are each 100 mol %.

4,959,451

NOVEL DIALLYL TEREPHTHALATE PREPOLYMER AND METHOD FOR PREPARING IT

Hiroshi Uchida; Kunioni Marumo, and Shigehiro Chaen, all of Ohita, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 17, 1989, Ser. No. 422,727
Claims priority, application Japan, Oct. 18, 1988, 63-262217
Int. Cl.[5] C08G 63/02
U.S. Cl. 528—272 8 Claims



1. A diallyl terephthalate prepolymer essentially having the following structure

$$CH_2{=}CHCH_2O(COArCOOBO)_nCOAr\text{-}COOCH_2CH{=}CH_2$$

wherein B is a divalent organic residue derived from a diol having 2 to 20 carbon atoms, Ar is a 1,4-phenylene group, and n is a value of 1 to 100, and having an unsaturation in a range of 20 to 100, as represented by an iodine value determined by the Wijs method.

4,959,452

ALPHA-AMINO-EPSILON-CAPROLACTAM-MODIFIED POLYAMIDE PREPARATION

Rolf-Volker Meyer; Rolf Dhein, both of Krefeld; Martin Wandel, Dormagen; Harald Selbeck, Krefeld; Friedrich Fahnler, Krefeld; Hans-Detlef Heinz, Krefeld, and Peter-Rolf Müller, Leverkusen, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Apr. 18, 1988, Ser. No. 182,336
Claims priority, application Fed. Rep. of Germany, May 1, 1987, 3714607; Mar. 2, 1988, 3806632
Int. Cl.[5] C08G 69/14
U.S. Cl. 528—328 17 Claims

1. A process for the preparation of predominantly aliphatic polyamide by the hydrolytic polymerization of at least one polyamide-forming lactam, wherein from 0.1 to 2% by weight of -amino-ε-caprolactam and a quantity of (poly)carboxylic acid, equivalent thereto are added to the lactam to be polymerized and to form a polyamide with increased viscosity and melt viscosity which has a branched structure but is still soluble in m-cresol.

4,959,453

PROCESS FOR THE PREPARATION OF A POLY(PARAPHENYLENE TEREPHTHALAMIDE)FIBROUS GEL COMPOSITION AND A PROCESS TO PRODUCE POLY(PARAPHENYLENE TEREPHTHALAMIDE) PAPER FROM THE COMPOSITION

Wilfred Sweeny, Wilmington, Del., assignor to E. I. du Pont de Nemours and Company, Wilmington, Del.

Filed Apr. 3, 1989, Ser. No. 332,792
Int. Cl.[5] C08G 69/28
U.S. Cl. 528—336 7 Claims

1. A process for preparing a poly(paraphenylene terephthalamide) fibrous gel composition consisting essentially of placing substantially stoichiometric amounts of terephthaloyl chloride in reactive contact with paraphenylene diamine in a solution, under agitation of:

(a) at least one amide solvent in an amount sufficient to yield a final concentration of poly(paraphenylene terephthalamide) in the range from about 3 to about 7 percent by weight of the solvent;

(b) at least 1.5 moles of an alkaline earth metal salt per mole of para-phenylenediamine;

(c) and N-methylpyrrolidine present in the range of from 1.0 to 2.0 moles per mole of para-phenylenediamine.

4,959,454

SPIRO(BIS)INDANE POLYETHERSULFONES AND METHOD FOR THEIR PREPARATION

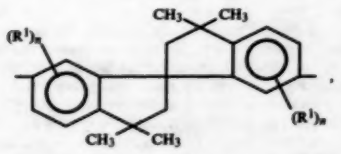
James M. Fukuyama, Clifton Park, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Continuation-in-part of Ser. No. 146,154, Jan. 20, 1988. This application May 19, 1989, Ser. No. 354,000
Int. Cl.[5] C08G 69/42, 63/00, 63/02
U.S. Cl. 528—352 9 Claims

1. A composition comprising linear polyethersulfones comprising structural units of the formula

$$-O-A^1-O-A^2- \quad (I)$$

wherein A^1 is a spiro(bis)indane moiety of the formula



(II)

A^2 is an aromatic radical containing at least one $-SO_2-$ group, each R^1 is independently C_{1-4} primary or secondary alkyl or halo and n is 0-3.

4,959,455

PRIMATE HEMATOPOIETIC GROWTH FACTORS IL-3 AND PHARMACEUTICAL COMPOSITIONS

Steven C. Clark, Winchester; Agnes B. Clarletta, Tewksbury, and Yu-Chung Yang, Arlington, all of Mass., assignors to Genetics Institute, Inc., Cambridge, Mass.

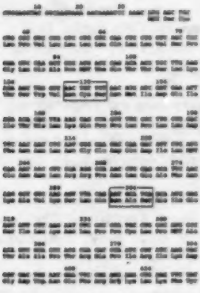
Continuation-in-part of Ser. No. 885,060, Jul. 14, 1986, abandoned, and Ser. No. 893,764, Aug. 6, 1986, abandoned, and Ser. No. 916,335, Oct. 7, 1986, Pat. No. 4,877,729. This application Mar. 4, 1987, Ser. No. 21,865
Int. Cl.[5] C07K 13/00; A61K 37/02; C12N 1/00
U.S. Cl. 530—351 11 Claims

1. A polypeptide that is free of association with other polypeptides and is encoded by a DNA selected from the group consisting of:

(i) the DNA insert in plasmid pXM (ATCC NO. 67154),

(ii) the DNA insert in Bacteriophage CSF-16 (ATCC No. 40246),

(iii) the DNA insert in plasmid pSHIL-3-1 (ATCC No. 67326),
(iv) the DNA insert in plasmid pHucIL-3-2 (ATCC No. 68042),
(v) a DNA capable of hybridizing under stringent conditions to a DNA of (i)-(iv), and,



(vi) a DNA differing from the DNAs of (i)-(v) in codon sequences due to the degeneracy of the genetic code;
said polypeptide having the ability to cause the formation of granulocyctic colonies in a human bone marrow assay at 10-100 picomolar concentrations or the ability to stimulate human chronic myelogenous leukemia (CML) cell proliferation at 10-100 picomolar concentrations.

4,959,456

MULTISTAGE PROCESS FOR PRODUCING POLYCARBONATE FROM OLIGOMER

Takashi Ashida; Noriyuki Kunishi, and Koji Yamamoto, all of Ichihara, Japan, assignors to Idemitsu Petrochemical Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 344,602
Claims priority, application Japan, Apr. 29, 1988, 63-106806
Int. Cl.[5] C08G *64/38*
U.S. Cl. 528—371 **8 Claims**

1. A process for producing polycarbonate by reacting a polycarbonate oligomer and a phenol compound in the presence of caustic alkali, which process comprises introducing the polycarbonate oligomer, caustic alkali and the phenol compound, the equivalent ratio of alkali to hydroxyl group in the phenol compound (alkali/hydroxyl group) being 0.9:1 to 1.8:1, in a first reaction zone where polymerization is carried out to produce polycarbonate having a viscosity average molecular weight of 3,000 to 15,000, and then introducing a reaction mixture containing the polycarbonate as produced in the first reaction zone into a second reaction zone where polymerization is carried out while adjusting the alkali concentration in the second reaction zone to 0.05 to 0.7N by regulating caustic alkali supplied.

4,959,457

ANTI-LYMPHOTOXIN

Timothy S. Bringman, Oakland, Calif., assignor to Genentech, Inc., S. San Francisco, Calif.

Filed May 31, 1984, Ser. No. 616,502
Int. Cl.[5] C07K *15/28, 17/02, 3/12*; C08H *1/00*
U.S. Cl. 530—387 **4 Claims**

1. An anti-lymphotoxin monoclonal antibody which neutralizes the cytolytic activity of a lymphotoxin having the amino acid sequence Leu-Pro-Gly-Val-Gly-Leu-Thr-Pro-Ser-Ala-Gln-Thr-Ala-Arg-Gln-His-Pro-Lys-Met-His-Leu-Ala-His-Ser-Thr-Leu-Lys-Pro-Ala-Ala-His-Leu-Ile-Gly-Asp-Pro-Ser-Lys-Gln-Asn-Ser-Leu-Leu-Trp-Arg-Ala-Asn-Thr-Asp-Arg-Ala-Phe-Leu-Gln-Asp-Gly-Phe-Ser-Leu-Ser-Asn-Asn-Ser-Leu-Leu-Val-Pro-Thr-Ser-Gly-Ile-Tyr-Phe-Val-Tyr-Ser-Gln-Val-Val-Phe-Ser-Gly-Lys-Ala-Tyr-Ser-Pro-Lys-Ala-Thr-Ser-Ser-Pro-Leu-Tyr-Leu-Ala-His-Glu-Val-Gln-Leu-Phe-Ser-Ser-Gln-Tyr-Pro-Phe-His-Val-Pro-Leu-Leu-Ser-Ser-Gln-Lys-Met-Val-Tyr-Pro-Gly-Leu-Gln-Glu-Pro-Trp-Leu-His-Ser-Met-Tyr-His-Gly-Ala-Ala-Phe-Gln-Leu-Thr-Gln-Gly-Asp-Gln-Leu-Ser-Thr-His-Thr-Asp-Gly-Ile-Pro-His-Leu-Val-Leu-Ser-Pro-Ser-Thr-Val-Phe-Phe-Gly-Ala-Phe-Ala-Leu and which is free of non-neutralizing antibodies.

4,959,458

HYBRID CELL LINE FOR PRODUCING MONOCLONAL ANTIBODY TO A HUMAN MONOCYTE ANTIGEN, ANTIBODY, AND METHODS

Patrick C. Kung, Bridgewater, and Gideon Goldstein, Short Hills, both of N.J., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Division of Ser. No. 432,456, Oct. 4, 1982, abandoned, which is a division of Ser. No. 110,509, Jan. 8, 1980, Pat. No. 4,364,936.
This application Aug. 31, 1984, Ser. No. 645,895
The portion of the term of this patent subsequent to Dec. 21, 1999, has been disclaimed.
Int. Cl.[5] A61K *39/395*
U.S. Cl. 530—387 **3 Claims**

1. A monoclonal antibody produced by a hybridoma formed by fusion of cells from a mouse myeloma line and spleen cells from a mouse previously immunized with human mononuclear cells which reacts with an antigen found on normal human monocytes and granulocytes but not on normal human B cells.

4,959,459

SURFACE ACTIVE COMPOUNDS AND A PROCESS FOR THEIR PREPARATION

Marie-Henriette L. David, Gent, Belgium; Horst Guenther, Willich, Fed. Rep. of Germany; Hilde O. J. Lemmens, Hoboken, and Harald W. W. Roeper, Brussels, both of Belgium, assignors to Cerestar Holding BV, Sas Van Gent, Netherlands

Filed Mar. 20, 1989, Ser. No. 325,525
Claims priority, application United Kingdom, Mar. 21, 1988, 8806691
Int. Cl.[5] C07H *1/00, 3/00*; C08B *37/00*; C07G *3/00*
U.S. Cl. 536—1.1 **17 Claims**

1. A group of surface active compounds which are 6-C_8 to C_{22} acyl-1-C_3 to C_{12} alkylglucosides.

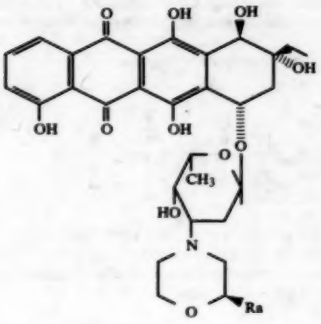
4,959,460

3'-DEAMINO-3'-(2"-SUBSTITUTED-4"-MORPHOLINO)-ANTHRACYCLINE COMPOUNDS

Shohachi Nakajima, and Nobuyasu Komeshima, both of Maebashi, Japan, assignors to Kirin Beer Kabushiki Kaisha, Tokyo, Japan

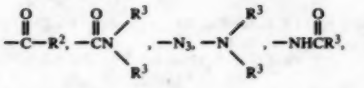
Filed Aug. 29, 1989, Ser. No. 400,470
Claims priority, application Japan, Sep. 2, 1988, 63-220203
Int. Cl.[5] C07H *15/24*
U.S. Cl. 536—6.4 **6 Claims**

1. An anthracycline compound of the formula (I):

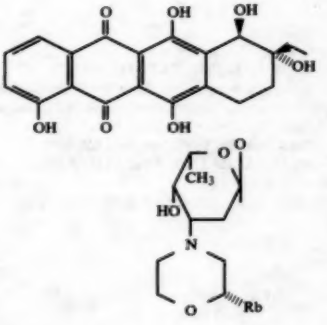


(I)

wherein Ra is $-R^1$,

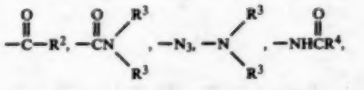


or $-OR^3$, R^1 being (1) alkyl, alkenyl, alkynyl, fluoroalkyl, aryl or aralkyl, or (2) alkyl, alkenyl, alkynyl, fluoroalkyl, aryl or aralkyl having substituents selected from the group consisting of carboxyl, azido, amino, hydroxy, alkoxy and a halogen atom; R^2 being R^1, a hydrogen atom or hydroxy; and R^3, which may be the same or different when one substituent has two R^3's, being R^1 or a hydrogen atom; or the formula (II):



(II)

wherein Rb is $-R^1$,



or $-OR^3$, R^1, R^2 and R^3 being as defined above; and R^4 being the same as R^3 except that methyl is not included; or an acid addition salt thereof.

4,959,461

PROCESSES FOR THE PREPARATION OF AMIDES AND AMINES FROM A MATERIAL HAVING CARBOXYL-CONTAINING POLYSACCHARIDES AND PRODUCTS THEREFROM

Mansour Yalpani, and Magdy M. Abdel-Malik, both of Kirkland, Canada, assignors to Domtar Inc., De Maisonneuve, Canada

Division of Ser. No. 201,438, Jun. 2, 1988, abandoned. This application Nov. 14, 1989, Ser. No. 436,163

Int. Cl.[5] C07K *17/00;* **C12N** *11/00, 9/00;* **C07H** *23/00*

U.S. Cl. 536—18.7 **16 Claims**

1. A method for the immobilization of a member selected from the group consisting of metal ions and proteins, from an aqueous solution containing a member selected from said group, comprising contacting said solution with an amidogen of a carboxyl-containing polysaccharide selected from the group consisting of amido alkyl ether and amino alkyl ether of carboxyl-containing polysaccharides,

wherein the nitrogen of the amido and amino group is directly attached to an alkyl group, said alkyl group itself joining an oxygen and said oxygen joining a carbon forming one saccharide ring unit of said carboxyl-containing polysaccharide, at either:

(a) position 5 or

(b) at least one of the positions 2, 3 and 6 of said saccharide ring,

said group selected from amino alkyl ether and amido alkyl ether defining in the case of (b) a side chain that is exocyclic of said polysaccharide ring, and in the case of (a) of amido alkyl and amino alkyl directly attached to the carbon of the position 5 of a polysaccharide unit,

and in the case of (a), carboxyl groups being present on position 5 of saccharide ring units of said carboxyl-containing polysaccharide, and in the case of (b), alkyl carboxyl groups being present in at least one of the positions 2, 3 and 6 of saccharide ring units of said carboxyl-containing polysaccharide, whereby said amidogen holds said member selected of said group, from said aqueous solution.

4,959,462

DESOXYRIBONUCLEIC ACID; MICROORGANISMS; DIAGNOSTIC AGENT FOR DELTA INFECTION AND THE USE THEREOF

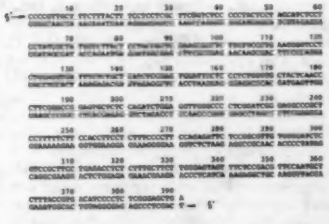
Reinder Dijkema, Oss, and Antonides Kos, Leiden, both of Netherlands, assignors to Nederlandse Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek, The Hague, Netherlands

Filed Jan. 28, 1986, Ser. No. 823,196

Claims priority, application Netherlands, Jul. 31, 1984, 8402392

Int. Cl.[5] C07H *21/04;* **C12Q** *1/68;* **C12N** *15/00;* **G01N** *33/53*

U.S. Cl. 536—27 **9 Claims**



7. A DNA selected from the group consisting of DNA having the following base sequence

5' →

10	20	30
CCCCGTTGCT	TTCTTTACTT	TCCTCCTCGC
GGGGCAACGA	AAGAAATGAA	AGGAGGAGCG
40	50	60
TTCGGTCTCC	CCCTACTCCT	AGCATCTCCT
AAGCCAGAGG	GGGATGAGGA	TCGTAGAGGA
70	80	90
CCTATCGCTA	TGGTCTTACT	CCTACCGCTC
GGATAGCGAT	ACCAGAATGA	GGATGGCGAG
100	110	120
GAAGCGCCTC	TTGTTCGCTG	AAGGGGTCCT
CTTCGCGGAG	AACAAGCGAC	TTCCCCAGGA
130	140	150
CTGGAGGTGA	TTTCTCTGCT	CATCTCCGAG
GACCTCCACT	AAAGAGACGA	GTAGAGGCTC
160	170	180
TGGATTCCTC	CCTCTGGGTG	CTACTCAACC
ACCTAAGGAG	GGAGACCCAC	GATGAGTTGG
190	200	210
CTTCGGGCCG	GAGTGCTCTC	CAGATCTGGA
GAAGCCCGGC	CTCACGAGAG	GTCTAGACCT
220	230	240
GGTTGGGCCC	CTCGGATCGG	GAGGCCCGCT
CCAACCCGGG	GAGCCTAGCC	CTCCGGGCGA
250	260	270
CCTTTTTCTT	CCACCTTCCT	CTTTCCCCTT
GGAAAAAGAA	GGTGGAAGGA	GAAAGGGGAA
280	290	300
CCAGAGATTC	TCCGGCGTTG	TGGGGATCTC
GGTCTCTAAG	AGGCCGCAAC	ACCCCTATAG
310	320	330
GTCCGCTTCC	TGAGACCTCT	CTTTGCTTCT
CAGGCGAAGG	ACTCTGGAGA	GAAACGAAGA
340	350	360
TGGGAGTAGT	TTCTCCGACG	TTCCAATGCT
ACCCTCATCA	AAGAGGCTGC	AAGGTTACGA
370	380	390
CTTTACCGTG	ACATCCCCTC	TCGGGAGCTG
GAAATGGCAC	TGTAGGGGAG	AGCCCTCGAC
		A
		T ← 5',

a DNA homologous therewith as to at least 60%, or a portion thereof, and capable of selective hybridization with δ-RNA.

4,959,463

INTERMEDIATES

Brian C. Froehler, Belmont, and Mark D. Matteucci, Redwood City, both of Calif., assignors to Genentech, Inc., South San Francisco, Calif.

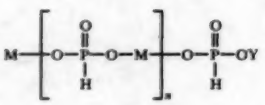
Continuation-in-part of Ser. No. 787,280, Oct. 15, 1985, abandoned. This application Sep. 19, 1986, Ser. No. 910,048

Int. Cl.[5] **C07H** *19/06, 19/16, 21/04, 21/02*

U.S. Cl. 536—27 **25 Claims**

1. A process for the synthesis of a polyribonucleotide or polydeoxyribonucleotide comprising (a) contacting a carrier-bound ribonucleotide or deoxyribonucleotide with a ribonucleoside H-phosphonate or deoxyribonucleotide H-phosphonate in the presence of an acylating agent under conditions for condensing the carrier-bound ribonucleotide or deoxyribonucleotide with the ribonucleoside H-phosphonate or deoxyribonucleoside H-phosphonate, wherein a hydroxyl of the ribonucleoside H-phosphonate or deoxynucleoside H-phosphonate is substituted with a blocking group for restricting the condensation reaction to the carrier-bound ribonucleotide or deoxyribonucleotide, (b) removing the blocking group from the ribonucleotide or deoxyribonucleotide hydroxyl, and (c) sequentially repeating steps (a) and (b) until a polynucleotide H-phosphonate having greater than two nucleotides has been obtained.

12. A compound having the formula



wherein Y is a positively charged counterion, n is ≧1, M is a ribonucleoside or deoxyribonucleoside, and the ribonucleosides or deoxyrobonucleoside are covalently linked through their 5' and 3' hydroxyl groups.

4,959,464

PROCESS FOR DERIVATIZING POLYGALACTOMANNAN USING WATER SOLUBLE ALUMINUM SALTS IN THE PROCESS

Michael H. Yeh, Louisville, Ky., assignor to Hi-Tek Polymers, Inc., Jeffersontown, Ky.

Filed Nov. 7, 1988, Ser. No. 268,287

Int. Cl.[5] **C07H** *1/00*

U.S. Cl. 536—114 **11 Claims**

1. In a process for preparing derivatives of a polygalactomannan gum which comprises reacting the gum particles with a derivatizing agent in aqueous medium followed by the steps of washing with water and drying, the improvement which comprises reacting the gum with a water soluble aluminum salt after the derivatizing reaction and prior to the washing step, whereby the surface of the gum particles is crosslinked, thereby inhibiting absorption of the wash water into the gum particles.

4,959,465

LOW CALORIE FAT MIMETICS

Lawrence P. Klemann, Somerville; John W. Finley, Whippany, and Anthony Scimone, Cedar Grove, all of N.J., assignors to Nabisco Brands, Inc., East Hanover, N.J.

Filed Feb. 26, 1988, Ser. No. 160,851

Int. Cl.[5] **A23D** *3/00, 5/00;* **C11C** *3/00*

U.S. Cl. 536—115 **18 Claims**

1. A fat mimetic composition having the following formula:

wherein

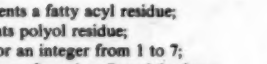
FA represents a fatty acyl residue;

R represents polyol residue;

m is zero or an integer from 1 to 7;

n is an integer from 1 to 7; and further

B is selected from the group consisting of



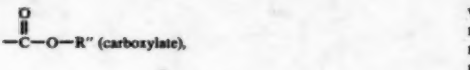
and the R' groups are the same or different and contain residues of the following structure:

where:

C is a carbon atom;

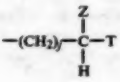
X is a bridging bonding valence, hydrogen, or substituted or unsubstituted lower aliphatic group, the various X groups being the same or different;

Q is selected from the group consisting of



—O-R″ (alkoxy), and —R‴—O-R″ (alkylalkoxy) radicals;

R″ is substituted or unsubstituted organic group defined by the following formula



R‴ is a lower alkylene; group;

the various R′, R″, and R‴groups, respectively, being the same or different;

T is hydrogen or a substituted or unsubstituted aliphatic group;

Z is a bridging bonding valence, hydrogen, or a residue of an alcohol, a glycol ester, or an ether; with the proviso that there is only one bridging bonding valence per R′ group; and where:

a=0 to 3;
b=0 to 4;
d=1 or 2;
e=0 to 5;
f=0 to 3;
g=0 to 4;
h=1 or 2;
j=0 to 10.

4,959,466

PARTIALLY ESTERIFIED POLYSACCHARIDE (PEP) FAT SUBSTITUTES

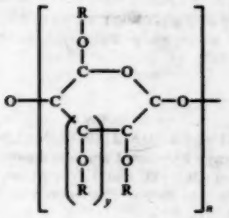
John F. White, Summit, N.J., assignor to Arco Chemical Technology, Inc., Wilmington, Del.

Filed Jan. 25, 1988, Ser. No. 147,806

Int. Cl.[5] C07H *13/00*; C08B *31/00, 35/00*; A23D *7/00*

U.S. Cl. 536—119 **20 Claims**

1. Partially esterified polysaccharides (PEPs) of the formula $[P—O(R)_x]_n$ having the structure:



where P is a polysaccharide, n has an average value in the range of 3–50, y is 0–4, R is H or a same or different C_{3-28} acyl moiety, and x is the degree of esterification ranging from 1–80 percent and is selected sufficient that the PEPs are resistant to digestive tract hydrolysis and absorption and exhibit properties ranging from oils through fats to greases.

14. A low calorie food composition containing fat-type organoleptic ingredients, comprising fat ingredients and non-fat ingredients, wherein from about 10 to 100% of the total fat-type ingredients comprises at least one partially esterified polysaccharide as in claim 1.

4,959,467

CONTROL OF PRODUCT SELECTIVITY IN THE ADDITION OF HCN TO ARABINOSE

Blaise J. Arena, Des Plaines, Ill., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Continuation-in-part of Ser. No. 802,503, Nov. 27, 1985, abandoned. This application Feb. 16, 1988, Ser. No. 156,500

Int. Cl.[5] C07B *37/02*; C07H *1/06*

U.S. Cl. 536—124 **12 Claims**

1. In the method of making a mixture of L-glucose cyanohydrin and L-mannose cyanohydrin by hydrogen cyanide addition to an aqueous solution of L-arabinose, the improvement comprising increasing the relative amount of L-glucose cyanohydrin in the cyanohydrin mixture by effecting the hydrogen cyanide addition to L-arabinose in the presence of at least 0.1 molar proportions of a reagent selected from the group consisting of water soluble aluminates, vanadates, chromates, molybdates, manganates, ferrates, borates, cuprates, tungstates, silicates, stannates, plumbates, germanates, and rare earth salts.

5. A method of controlling the cyanohydrin product ratio in hydrogen cyanide addition to monosaccharides comprising reacting the elements of hydrogen cyanide with an aqueous solution of a complex of the monosaccharide resulting from complexation of the monosaccharide with an agent which complexes hydroxyl groups of monosaccharides, said complexing agent being selected from the group consisting of water soluble aluminates, vanadates, chromates, molybdates, manganates, ferrates, borates, cuprates, tungstate, silicates, stannates, plumbates, germanates or rare earth salts.

4,959,468

COLOR STABILIZATION METHOD FOR GLYCOSIDE PRODUCTS

Prasad S. Ravi, Decatur; Hunter L. Kickle, Mt. Zion; Patrick M. McCurry, Decatur, and David J. Skogberg, Decatur, all of Ill., assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Continuation of Ser. No. 61,859, Jun. 12, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 333,820

Int. Cl.[5] C07H *1/06*

U.S. Cl. 536—127 **17 Claims**

1. A method for improving the color stability of glycoside products comprising: treating said glycoside product by contacting the glycoside product with a color stabilizing amount of from about 0.01 to about 2 weight percent, on a glycoside product dry weight basis, of a borohydride material selected

from the group consisting of Group I or Group II metal borohydride salts for a time period sufficient to substantially reduce the propensity of said glycoside product to darken upon exposure to elevated temperatures under alkaline conditions.

4,959,469

CRYSTALLINE CEPHALOSPORIN COMPOUNDS

Susumu Nakagawa; Ryosuke Ushijima; Fumio Nakano; Koji Yamada, all of Okazaki, and Eiichi Mano, Kariya, all of Japan, assignors to Banyu Pharmaceutical Company, Ltd., Tokyo, Japan

Continuation of Ser. No. 813,614, Dec. 26, 1985, Pat. No. 4,677,100. This application Feb. 27, 1989, Ser. No. 315,917

Claims priority, application Japan, Dec. 27, 1984, 59-273591; Aug. 6, 1985, 60-171839; Dec. 9, 1986, 61-291431; PCT Int'l Appl., Jun. 25, 1987, PCT/JP87/00417

Int. Cl.[5] **C07D** *501/46*

U.S. Cl. 540—222 **3 Claims**

1. Crystalline (6R,7R)-7-[(Z)-2-(2-aminothiazol-4-yl)-2-(1-carboxy-1-methylethoxyimino)acetamido]-3-(5,6-dihydroxy-2-methyl-2-isoindolinium)methyl-3-cephem-4-carboxylate sulfate or its hydrate.

4,959,470

2-OXO-[[(SUBSTITUTED SULFONYL)-AMINO]CARBONYL]-AZETIDINES

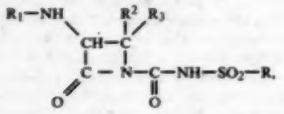
Uwe D. Treuner, Etterzhausen, Fed. Rep. of Germany, assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Filed Aug. 17, 1988, Ser. No. 232,972

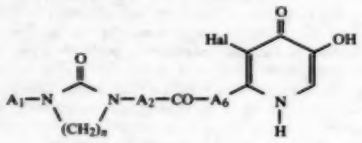
Int. Cl.[5] **A61K** *31/64;* **C07D** *401/14, 417/14*

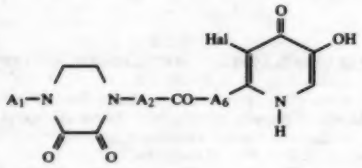
U.S. Cl. 540—363 **8 Claims**

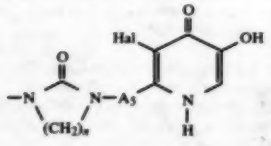
1. Compound of the formula



and pharmaceutically acceptable salts thereof, wherein R is







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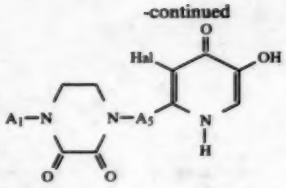
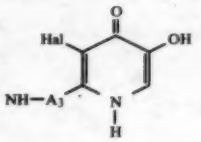
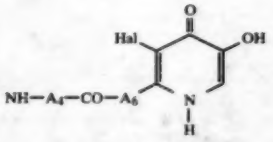
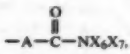




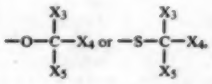


R_1 is an acyl group derived from a carboxylic acid;

R_2 and R_3 are the same or different and each is hydrogen, alkyl, alkenyl, alkynyl, cycloalkyl, phenyl, substituted phenyl or a 4, 5, 6 or 7-membered heterocycle or one of R_2 and R_3 is hydrogen and the other is azido, halomethyl, dihalomethyl, trihalomethyl, alkoxycarbonyl, 2-phenylethenyl, 2-phenylethynyl, carboxyl, $—CH_2X_1$ wherein X_1 is azido, amino, hydroxy, carboxyl, alkoxycarbonyl, alkanoylamino, phenylcarbonylamino, (substituted phenyl)-carbonylamino, alkylsulfonyloxy, phenylsulfonyloxy, (substituted phenyl)sulfonyloxy, phenyl, substituted phenyl, cyano,

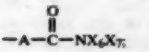


—S—X_2, or —O—X_2 (wherein A, X_2, X_6 and X_7 are as hereinafter defined); —S—X_2 or —O—X_2; wherein X_2 is alkyl, substituted alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, alkanoyl, substituted alkanoyl, phenylalkanoyl, (substituted phenyl)alkanoyl, phenylcarbonyl, (substituted phenyl)carbonyl, or heteroarylcarbonyl; and in the case of when X_1 is O—X_2 then X_2 can also be alkylideneamino, alkanoylamino, carboxyalkylideneamino, alkylsulphonylamino, alkoxycarbonyl, alkylsulphonylamino or N,N-cyclodialkanoylamino,



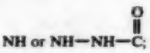
wherein one of X_3 and X_4 is hydrogen and the other is hydrogen or alkyl, or X_3 and X_4 when taken together with the carbon atom to which they are attached form a cycloalkyl group; and X_5 is formyl, alkanoyl, phenylcarbonyl, (substituted phenyl)-carbonyl, phenylalkylcarbonyl, (substituted phenyl)alkyl-

carbonyl, carboxyl, alkoxycarbonyl, aminocarbonyl, (substituted amino)carbonyl, or cyano; or

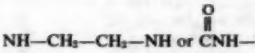


wherein A is CH=CH—, —(CH_2)m—, —(CH_2)m—O—, —(CH_2)m—NH—, or —CH_2—S—CH_2—, m is 0, 1 or 2, and X_6 and X_7 are the same or different and each is hydrogen, alkyl, phenyl or substituted phenyl, or X_6 is hydrogen and X_7 is amino, substituted amino, alkanoylamino or alkoxy, or X_6 and X_7 when taken together with the nitrogen atom to which they are attached form a 4, 5, 6 or 7-membered heterocycle;

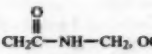
A_1 is a single bond,



A_2 is a single bond,



A_3 is a (CH_2)p—; NH—CH_2,



A_4 is —NH,

n is two or three;

p is zero or one;

q is zero or one;

t is one, two, three or four

Hal is Br, Cl, or I

A_5 is a single bond; CH_2; NH—CH_2; —N=CH—; —CO—NH—(CH_2)q

A_6 is a single bond; CH=CH; —$(CH_2)_t$—;

wherein the term "substituted alkyl" refers to alkyl groups substituted with azio, amino, halogen, hydroxy, carboxy, cyano, alkoxycarbonyl, aminocarbonyl, alkanoyloxy, alkoxy, phenyloxy, (substituted phenyl)oxy, mercapto, alkylthio, phenylthio, (substituted phenyl)-thio, alkylsufinyl or alkylsulfonyl groups;

the term "substituted amino" refers to a group having the formula —NX_8X_9 wherein X_8 is hydrogen, alkyl, phenyl, substituted phenyl, phenylalkyl or (substituted phenyl)alkyl, and X_9 is alkyl, phenyl, substituted phenyl, phenylalkyl, (substituted phenyl)alkyl, hydroxy, cyano, alkoxy, phenylalkoxy or amino;

the term "heteroaryl" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imdazolyl, thiazolyl, thiadiazolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazol, tetrazolyl or one of the above groups substituted with one of more halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, benzylideneamino, or substituted alkyl wherein the alkyl group has 1 to 4 carbon atoms, groups;

the term "a 4, 5, 6 or 7-membered heterocycle" refers to pyridinyl, furanyl, pyrrolyl, thienyl, 1,2,3-triazolyl, 1,2,4-triazolyl, imidazolyl, thiazolyl, thiadizolyl, pyrimidinyl, oxazolyl, triazinyl, tetrazolyl, azetinyl, oxetanyl, thietanyl, piperidinyl, piperazinyl, imidazolylidinyl, oxazolidinyl, pyrrolidinyl, tetrahydropyrimidinyl, dihydrothiazolyl or hexahydrazepinyl or one of the above groups substituted with one or more oxo, halogen, hydroxy, nitro, amino, cyano, trifluoromethyl, alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, alkylsulfonyl, phenyl, substituted phenyl, 2-furfurylideneamino, benzylideneamino, or substituted alkyl wherein the alkyl groups has 1 to 4 carbon atom, groups.

4,959,471

PHOTOCHROME SPIROINDOLINE-OXAZINES

Manfred Melzig, Wessling, Fed. Rep. of Germany, assignor to Optische Werke G. Rodenstock, Munich, Fed. Rep. of Germany

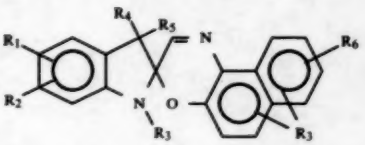
Filed May 1, 1989, Ser. No. 345,840

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814631

Int. Cl.[5] C07D *498/10*

U.S. Cl. 544—71 **13 Claims**

1. A photochrome compound defined by the following general equation



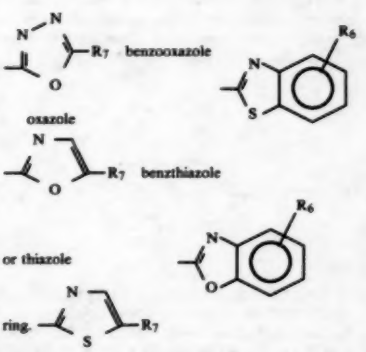
wherein R_1, R^2, =—CN, $-CF_3$, —Y, OY, $-NY_2$ Y=H, alkyl residue with up to 8 C-atoms, aryl or heteroaryl residue;

R_3, R_4, R_5=—CH_3, —C_2H_5, —C_3H_7, —phenyl, —benzyl, —pyridyl or R_4 and R_5 may close to form a C_5–C_7 cycloalkane ring

R_6=—Y, OY, —CN, —NO_2, —Cl, or —Br 1

R_7=—H, —CH_3, —C_2H_5, —phenyl, —benzyl, —pyridyl, or -naphth(2)yl or -phenyl, -benzyl, -pyridyl, or -naphth(-2)yl substituted by -OH in the ortho position; and

R_8 is an oxadiazole



4,959,472

PROCESS FOR PREPARING SUBSTANTIALLY PURE DIASTEREOISOMERS OF TETRAHYDROFOLIC DERIVATIVES

Hamish C. S. Wood; Colin J. Suckling, and Lilias G. Rees, all of Glasgow, Scotland, assignors to University of Strathclyde, Glasgow, Scotland

Continuation of Ser. No. 91,989, Sep. 2, 1987, abandoned. This application Sep. 1, 1989, Ser. No. 403,917

Claims priority, application United Kingdom, Sep. 3, 1986, 8621268

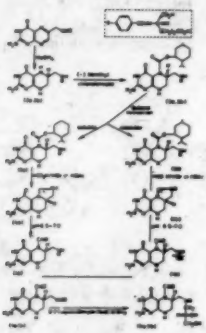
Int. Cl.[5] C07D *475/04*

U.S. Cl. 544—258 **8 Claims**

1. A process for the preparation of a desired substantially

pure (6R or 6S) diastereoisomer of a derivative of tetrahydrofolic acid selected from leucovorin (5- formyltetrahydrofolic acid) or a salt or ester thereof, and 5- methyl-or 5,10-methylene or 5,10 methanol-tetrahydrofolic acid or a salt or ester thereof which process compresses the steps of:

(a) attaching a chiral auxiliary group at either N-5 or N-10 of a mixture of 6R and 6S diastereoisomers tetrahydrofolic acid or of a substituted tetrahydrofolic acid or said or ester thereof, so as to form a pair of new diastereoismers, said chiral auxiliary group is one alcohol selected from the



group consisting of (−) menthol, (−) boneol, (−) isoborneol;

(b) separating the pair of new diastereoisomers and recovering the new diastereoisomer (6R or 6S) diastereoisomer; and corresponding to said desired (6R or 6S) diastereoisomer; and

(c) converting the substantially pure new diastereoisomer so isolated into the corresponding desired substantially pure (6R or 6R) diastereoisomer of a derivative of tetrahydrofolic acid or salt or ester thereof.

4,959,473

7-ETHOXY-5-FLUOROMETHYL-1,2,4-TRIAZOLO[1,5-a] PYRIMIDINE-2-SULFONAMINDES

Norman R. Pearson, Walnut Creek; William A. Kleschick, Martinez, both of Calif., and Chrislyn M. Carson, Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

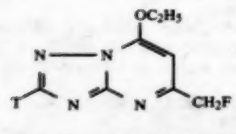
Filed Apr. 19, 1988, Ser. No. 183,571

The portion of the term of this patent subsequent to Feb. 27, 2007, has been disclaimed.

Int. Cl.[5] C07D *403/14*

U.S. Cl. 544—263 **3 Claims**

1. A compound of the formula



wherein T represents (C_2–C_4)alkylthio, benzylthio, or $ClSO_2$.

4,959,474

DIALKOXY PYRIDOPYRIMIDINE COMPOUNDS

Eugene M. Grivsky, Fairfax, Va., assignor to Burroughs Wellcome Co., Research Triangle Park, N.C.

Continuation of Ser. No. 381,365, May 24, 1982, abandoned, and a continuation of Ser. No. 159,246, Jun. 13, 1980, abandoned. This application Oct. 15, 1985, Ser. No. 786,725

Claims priority, application United Kingdom, Jun. 14, 1979, 7920706

Int. Cl.[5] C07D *471/04*

U.S. Cl. 544—279 **3 Claims**

1. 2,4-Diamino-6-(2,5-dimethoxybenzyl)-5-methylpyrido[2,3-d]pyrimidine.

4,959,475

PROCESS FOR THE PRODUCTION OF 2,4-DIAMINO-6-PIPERIDINYL-PYRIMIDINE-3-N-OXIDE

Lester Mills, Naters; Hans P. Mettler, Brig-Glis; Felix Previdoli, Brig, and Francois Moulin, Neuchâtel, all of Switzerland, assignors to Lonza Ltd., Gampel/Valais, Switzerland

Filed Dec. 28, 1989, Ser. No. 458,292

Claims priority, application Switzerland, Jan. 4, 1989, 20/89

Int. Cl.[5] C07D *401/04*

U.S. Cl. 544—324 **14 Claims**

1. Process for the production of 2,4-diamino-6-piperidinyl-pyrimidine-3-N-oxide, comprising converting in situ hydroxylamine and cyanamide in a lower alcohol as a solvent in the presence of an alkali alcoholate into the corresponding hydroxyguanidine, converting the latter with a cyanoacetic acid ester, with ring formation, to the 2,4-diamino-6-hydroxypyrimidine-3-N-oxide, chlorinating the N-oxide by chlorination with $POCl_3$ the presence of an amine as a catalyst to 2,4-diamino-6-chloropyrimidine-3-N-oxide, and converting the latter with piperidine to the end product.

14. 2,4-Diamino-6-hydroxypyrimidine-3-N-oxide.

4,959,476

METHOD FOR THE PREPARATION OF HERBICIDAL O-CARBOXYARYLIMIDAZOLINONES

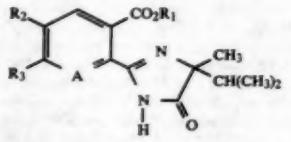
Robert F. Doehner, Jr., East Windsor, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 148,743, Jan. 27, 1988, Pat. No. 4,861,887. This application Jun. 30, 1989, Ser. No. 373,438

Int. Cl.[5] C07D *401/04*

U.S. Cl. 546—167 **7 Claims**

1. A method for the preparation of o-carboxyaryl imidazolinone compounds represented by formula I



(I)

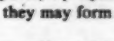
wherein

A is CH or N;

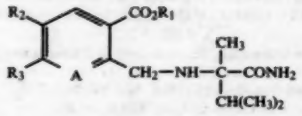
R_1 is H or C_1–C_{12} alkyl;

R_2 is H or C_1–C_6 alkyl;

R_3 is H, C_1–C_6 alkyl, or when R_2 and R_3 are taken together they may form a ring represented by



comprising, reacting a 2-{[(1-carbamoyl-1,2-dimethylpropyl)amino]methyl}benzoic acid, nicotinic acid, or quinoline-3-carboxylic acid of formula II



(II)

wherein A, R_1, R_2, and R_3 are as described for formula I above with a mixture of two molar equivalents of a brominating agent in the presence of an acid acceptor.

4,959,477

OPTICALLY NONLINEAR PYRIDINE-N-OXIDE COMPLEXES

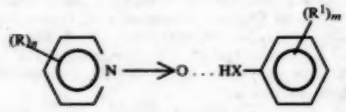
Margaret C. Etter, St. Paul; Gayle M. Frankenbach, Minneapolis, and Thomas W. Panunto, St. Paul, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.

Division of Ser. No. 124,886, Nov. 24, 1987. This application Feb. 14, 1989, Ser. No. 312,364

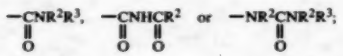
Int. Cl.[5] C07D *213/89*

U.S. Cl. 546—307 **36 Claims**

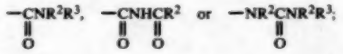
1. A crystalline compound of the formula:



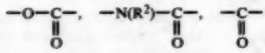
wherein n is 0–5, m is 0–5, R^1 is individually $—NO_2$, $—OR^2$, —CN, $—NR^2R^3$, $—CH_3$, $—CO_2H$, halo,



R is individually, $—NO_2$, $—CH_3$, $—OR^2$, $—NR^2R^3$, —CN,



and X is $—N(R^2)—$, —S—,



or —C≡C—; wherein R^2 and R^3 are individually H, (C_1–C_5)alkyl, aryl or ar(C_1–C_5)alkyl; with the proviso that when m=n=1, R^1 is 4-NH_2 and X is

R cannot be 4-NO_2.

4,959,478

METHOD OF PRODUCING-COARSE CRYSTALLINE NICOTINIC ACID WITH A HIGH DEGREE OF PURITY

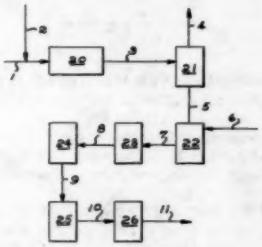
Alexander Möller, Gelnhausen; Heinz Friedrich, Hanau; Herbert Kuhn, Alzenau, and Kurt Winkler, Rossbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Continuation of Ser. No. 41,004, Apr. 21, 1987, abandoned. This application Feb. 28, 1989, Ser. No. 318,414

Claims priority, application Fed. Rep. of Germany, Apr. 25, 1986, 3614019

Int. Cl.[5] C07D *213/80, 213/803*

U.S. Cl. 546—319 **7 Claims**



1. A method of producing coarse-crystalline nicotinic acid with a high degree of purity comprising the steps of:

(a) reacting an aqueous solution of 3-cyanopyridine with an equimolar amount of an alkali hydroxide dissolved in water, at a temperature between 130° and 190° C. and pressure between 1.5 and 2.0 MPa,

(b) separating out the ammonia released during the reaction,

(c) slowly treating the ammonia-free alkali nicotinate solution obtained at a temperature between 99° and 130° C. with an aqueous mineral acid in such a manner that the pH of the solution remains above 3.7,

(d) subsequently cooling the developing nicotinic acid suspension down to 0° to 20° C.

(e) separating out the crystallized nicotinic acid whereby crystals having a particle distribution of between 150 and 300μ(>75%) are formed.

4,959,479

INDOLE DERIVATIVES

Yoshinobu Nagawa; Koichi Honda, both of Tsukuba, and Hiroshi Nakanishi, Tsuchiura, all of Japan, assignors to Agency of Industrial Science & Technology, Tokyo, Japan

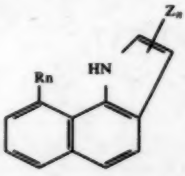
Division of Ser. No. 237,465, Aug. 29, 1988, Pat. No. 4,889,937. This application Oct. 26, 1989, Ser. No. 426,648

Claims priority, application Japan, Sep. 16, 1987, 62-231391

Int. Cl.[5] C07D *249/06, 403/02*

U.S. Cl. 548—255 **5 Claims**

1. Indole derivatives of the following formula (I):



(I)

wherein R represents a Wn

group or a R'nN-group, Z represents a hydrogen atom or a C_1–C_5 carboxylic acid alkyl ester group, W represents a hydrogen atom or a C_1–C_5 carboxylic acid alkyl ester group, R' represents an C_1–C_5 alkyl group, and n in each instance above is the number 1 or 2.

4,959,480

PHOTOGRAPHIC SILVER HALIDE MATERIALS AND PROCESS COMPRISING A PYRAZOLOAZOLE COUPLER

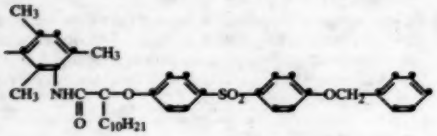
Sharon E. Normandia, Macedon; Arlyce T. Bowne, Rochester, both of N.Y.; Nigel E. Milner, and David Clarke, both of Watford, Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 23,517, Mar. 9, 1987, abandoned. This application Mar. 9, 1988, Ser. No. 166,084

Int. Cl.[5] C07D *249/00, 215/26, 213/64;* **C07F** *9/06*

U.S. Cl. 548—262.4 **2 Claims**

1. A 1H-pyrazolo[3,2-c]-s-triazole wherein the 6-position is substituted by a methyl, ethyl, propyl, n-butyl, or t-butyl group; wherein the 7-position is substituted by a halogen atom; and wherein the 3-position is substituted by an ortho-substituted phenyl group consisting of



4,959,481

FLAME RETARDANT COMPOUNDS AND THERMOPLASTIC COMPOSITIONS CONTAINING THE SAME

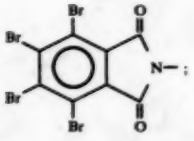
Robert J. Axelrod, Glenmont, N.Y.; Donald B. G. Jaquiss, Pittsfield, Mass., and John A. Tyrell, Mt. Vernon, Ind., assignors to General Electric Company, Selkirk, N.Y.

Division of Ser. No. 892,344, Aug. 1, 1986, Pat. No. 4,743,637. This application May 4, 1988, Ser. No. 789,970

Int. Cl.[5] C07D *209/02, 209/48*

U.S. Cl. 548—462 **36 Claims**

1. A flame retardant compound comprising a polyalkylene oxide or derivative thereof end-capped with brominated phthalimide groups and being of the formulae



R^1 is alkylene of from about 2 to about 6 carbon atoms, R^2 is alkyl of from about 1 to about 6 carbon atoms; n is from about 4 to about 40; and n' is from about 3 to about 15 and n'' is from about 1 to about 10.

4,959,482

PYRROLIDINONE COMPOUNDS AND PHARAMACEUTICAL COMPOSITIONS CONTAINING SAME

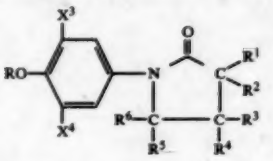
Sung J. Lee, Clarks Summit, Pa., assignor to Biofor, Ltd., Waverly, Pa.

Filed Sep. 26, 1988, Ser. No. 248,942

Int. Cl.[5] C07D *207/26;* **A61K** *31/40*

U.S. Cl. 548—543 **20 Claims**

1. A compound of the formula:



wherein:

R is a member selected from the group consisting of hydrogen, alkyl, alkanoyl and aroyl;

R^1–R^6 are the same or different and represent a member selected from the group consisting of hydrogen and lower alkyl; and

X^3 and X^4 are the same or different and represent a member selected from the group consisting of tertiary-lower alkyl and trimethylsilyl; and the non-toxic pharmacologically acceptable salts thereof.

4,959,483

D-GLUCOSACCHAROASCORBIC ACID

Koichi Matsumura, Ibaraki; Hiroshi Kimura, Suita; Noritoshi Mise, Takatsuki, and Hiroshi Miki, Suita, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

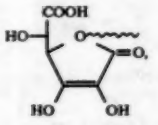
Continuation of Ser. No. 946,505, Dec. 19, 1986, abandoned. This application Jun. 28, 1989, Ser. No. 372,111

Claims priority, application Japan, Dec. 25, 1985, 60-294575; Nov. 10, 1986, 61-268443

Int. Cl.[5] C07D *307/32*

U.S. Cl. 549—315 **4 Claims**

1. A compound selected from the group consisting of D-glucosaccharoascorbic acid of the formula



4,959,484

NOVEL STROBILURINE DERIVATIVES, THEIR PREPARATION AND THEIR USE

Lothar Daum, Otterstadt; Gerhard Keilhauer, Dannstadt-Schauernheim; Gisela Lorenz, Neustadt; Eberhard Ammermann, Ludwigshafen; Wolfgang Weber, both of Kaiserslautern; Wolfgang Steglich, Bonn-Roettgen; Bert Steffan, Rheinbach, and Angela Scherer, Bonn, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwighafen, Fed. Rep. of Germany

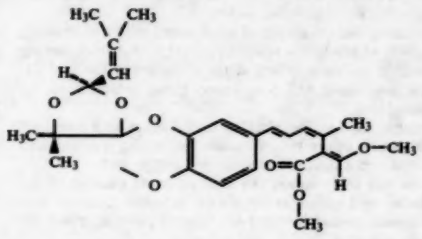
Filed Apr. 14, 1989, Ser. No. 338,174

Claims priority, application Fed. Rep. of Germany, May 6, 1988, 3815484

Int. Cl.[5] C07D *319/20*

U.S. Cl. 549—334 **1 Claim**

1. A compound of the formula



(II)

4,959,485

HEXAHYDRODIBENZOFURAN CARBOXYLIC ACID DERIVATIVES

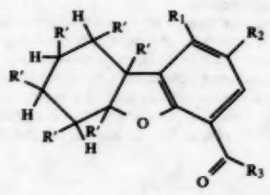
Raymond D. Youssefyeh, Princeton Junction, N.J.; Henry F. Campbell, North Wales, and Donald E. Kuhla, Doylestown, both of Pa., assignors to Rorer Pharmaceutical Corporation, Fort Washington, Pa.

Division of Ser. No. 186,824, Apr. 27, 1988, Pat. No. 4,863,921. This application May 15, 1989, Ser. No. 351,625

Int. Cl.[5] C07D *307/91*

U.S. Cl. 549—461 11 Claims

1. A compound of the formula



where R_1 is hydrogen, amino, alkylamino or halo; R_2 is hydrogen, halo, sulfamyi; alkylsulfamyl or alkylsulfonyl; R′ is hydrogen or alkyl; and R_3 is hydroxy, halo, alkoxy or aralkoxy; provided that R′, R_1 and R_2 are not all hydrogen at the same time.

4,959,486

ALKYLENE OXIDES PRODUCTION FROM ALKANES OR ALKYLAROMATICS USING MOLTEN NITRATE SALT CATALYST

B. Timothy Pennington, Sulphur, La., assignor to Olin Corporation, Cheshire, Conn.

Division of Ser. No. 238,714, Aug. 31, 1988, Pat. No. 4,885,374, and a continuation-in-part of Ser. No. 929,552, Nov. 12, 1986, Pat. No. 4,785,123. This application Aug. 3, 1989, Ser. No. 402,091

The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.

Int. Cl.[5] C07D *301/06*

U.S. Cl. 549—532 10 Claims

1. A product for producing an alkylene oxide or mixture of alkylene oxides by a reaction which comprises reacting an alkane or alkylaromatic compound having from 3 to 22 carbon atoms per molecule, or mixture thereof, with an oxygen-containing gas, said alkane or alkylaromatic compound and said oxygen-containing gas being gaseous reactants, by contacting said gaseous reactants with a bath, stream, spray or mist of at least one molten nitrate salt catalyst, said catalyst being present in an amount sufficient to absorb any heat generated during said reaction while maintaining an essentially constant reaction temperature, said reaction being conducted at a reaction temperature of between about 135° C. and about 600° C. and a reaction pressure of between about 1 and about 50 atmospheres, said process additionally employing a co-catalyst selected from the group consisting of elemental metals, and oxides and hydroxides thereof, and mixtures thereof, said co-catalyst being suspended, dispersed or dissolved in said molten nitrate salt catalyst.

4,959,487

PROCESS FOR PRODUCING AROMATIC NITRILE

Hirotaka Yamasaki, and Yoshio Hirosaka, both of Sodegaura, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Mar. 2, 1989, Ser. No. 318,170

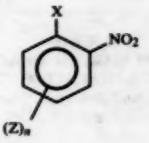
Claims priority, application Japan, Mar. 19, 1988, 63-66907

Int. Cl.[5] C07C *253/14*

U.S. Cl. 558—343 25 Claims

1. A process for producing an aromatic nitrile having a CN group and an NO_2 group on adjacent ring carbons atoms, said process comprising:

(a) reacting at a temperature of 100° to 250° C. an aromatic halide of the formula



wherein X is an halogen atom, Z is a halogen atom, an alkyl group having from 1 to 4 carbon atoms, a cyano group or a nitro group, and n is an integer of 1 to 4, with 0.2 to 0.5 mol of cuprous cyanide per mol of said aromatic halide and 0.1 to 2.0 mol of a cyanide of an alkali metal per mol of said aromatic halide in 0.1 to 30 parts by weight of at least one polar solvent selected from the group consisting of N,N-dimethyl formamide, N,N-dimethylacetamide, N-methyl-2-pyrrolidone, N,N′-dimethylimidazolidone, dimethylsulfoxide and sulfolane per 100 parts by weight of said aromatic halide to form a reaction product;

(b) extracting said reaction product from the resultant mixture at a temperature of at least 70° C. with an organic solvent having a boiling point of not less than 70° C.;

(c) washing the extracted solution with an alkaline aqueous solution and water, and

(d) removing solvent and aqueous wash solution to obtain said aromatic nitrile.

4,959,488

POLYFUNCTIONAL HEXASUBSTITUTED BENZENE DERIVATIVES

James M. Renga; Alan G. Olivero, and Mark Bosse, all of Santa Rosa, Calif., assignors to Henkel Research Corporation, Santa Rosa, Calif.

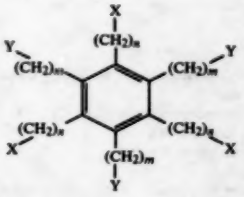
Filed May 17, 1989, Ser. No. 353,371

Int. Cl.[5] C07C *69/773, 57/30, 33/26, 67/30*

U.S. Cl. 560—76 31 Claims

1. A composition selected from the group consisting a compound of the formula I or II

(I)



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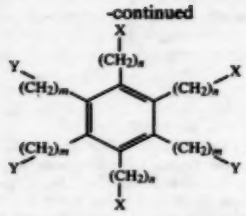


(II)

wherein each of X and Y is independently selected from the group consisting of CH_3, F, Cl, Br, I, and functional groups having N, O, S, P, or Si as hetero atom, with the proviso that X and Y are not both CH_3; each of m and n is an integer having a value of from 0 to 20, such that m+n=2 to 20, and when X=Y, m+n=4 to 20.

4. A compound of claim 1 wherein X is CO_2CH_3, Y is CH_3, m is 14 and n is 0.

4,959,489

PROCESS FOR MAKING AN ACRYLAMIDE CONTAINING A DIALKYL ACETAL GROUP

Andrew F. Nordquist, and Robert K. Pinschmidt, Jr., both of Whitehall, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Oct. 2, 1989, Ser. No. 416,289

Int. Cl.[5] C07C *229/30, 231/02*

U.S. Cl. 560—170 **11 Claims**

1. A process for making an acrylamide dialkyl acetal which comprises:

(a) reacting an acrylic acid ester with a nucleophile to form a β-substituted propionate,

(b) separating any excess nucleophile from said β-substituted propionate,

(c) reacting said β-substituted propionate with an amino dialkyl acetal in the presence of an aminolysis catalyst and the absence of protic solvent to form a β-substituted propionamide dialkyl acetal, and

(d) pyrolyzing said β-substituted propionamide dialkyl acetal to form said acrylamide dialkyl acetal.

4,959,490

PROCESS FOR MANUFACTURING DISULFONATE SURFACTANTS

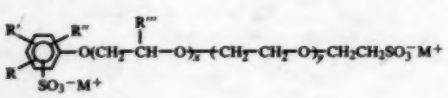
Margaret B. Parnell, Livermore, Calif.; Thomas L. Ashcraft, Jr., Baytown, and Kenneth M. Webber, Houston, both of Tex., assignors to Exxon Production Research Company, Houston, Tex.

Filed Nov. 14, 1988, Ser. No. 270,190

Int. Cl.[5] C07C *149/30*

U.S. Cl. 562—74 **20 Claims**

1. A process for synthesizing monosulfonated alkylphenol polyalkylene oxide sulfonates having the general formula:



where

R is a linear or branched alkyl group having from 3 to about 40 carbon atoms;

R', R'' and R''' are independently H or C_{1-3} alkyl groups;

x ranges from 0 to about 10;

y ranges from 0 to about 50; and

each M^+ is a cation;

comprising the steps of:

(a) reacting an alkylphenol with alkylene oxide in an oxyalkylation reaction to produce an oxyalkylated alkylphenol including an oxyalkylate chain;

(b) reacting said oxyalkylated alkylphenol with a sulfonating reagent to produce a sulfonic/sulfate acid dianion having a sulfate group attached at the terminus of the said oxyalkylate chain and a sulfonate group attached to the phenol ring;

(c) reacting said sulfonic/sulfate acid dianion with a neutralizing agent to produce a dianion salt having a neutralized sulfate and a neutralized sulfonate group; and

(d) reacting said dianion salt with an agent capable of displacing said sulfate group with a sulfonate group to produce said monosulfonated alkylphenol polyalkylene oxide sulfonate; and

(e) extracting said monosulfonated alkylphenol polyalkylene oxide sulfonate with a low molecular weight oxygenated organic solvent.

4,959,491

DETERGENT GRADE OLEFINS, ALKYLBENZENES AND ALKYLBENZENE SULFONATES AND PROCESSES FOR PREPARING

Richard S. Threlkel, El Cerrito, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 11, 1987, Ser. No. 24,742

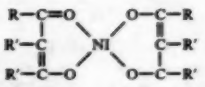
Int. Cl.[5] C07C *2/26, 143/24*

U.S. Cl. 562—94 **31 Claims**

1. A process for preparing C_{12} semi-linear olefins consisting essentially of the steps of:

(a) contacting a propylene feed with a selective dimerization catalyst, selective to the production of higher olefins, under dimerization conditions to produce a higher olefin product containing at least 60% by weight linear hexenes, under dimerization conditions and wherein said selective dimerization catalyst is selected from the group of:

(1) a complex of a nickel chelate having the formula



wherein R and R' independently are hydrogen, alkyl or aryl of up to 10 carbon atoms, or haloalkyl or haloaryl of up to 10 carbon atoms, with the proviso that the two R' groups of each chelating ligand together with the adjacent carbon atoms to which they are attached, can form a six-membered carbocyclic aromatic ring or a halogen substituted six-membered carbocyclic aromatic ring have 1 to 4 halogen substituents selected from the group of fluoro, chloro, bromo or iodo; with an alkyl aluminum alkoxide having the formula

$(R'')_m Al(OR'')_n$

wherein each R'' independently is alkyl of up to 10 carbon atoms, preferably of up to 4 carbon atoms, m is a whole number from 1 to 2 inclusive and n is a whole number from 1 to 2 inclusive selected so that the sum of m and n equals 3;

(2) a complex of bis(1,5-cyclooctadiene)nickel(O) with hexafluoro-2,4-pentanedione; and

(3) a complex comprising transition metal complex selected from complexes of nickel and palladium with a fluoro-organic thiol or sulfide ligand, having a single sulfur atom in a ligating position and wherein the carbon atom adjacent the carbon atom to which the sulfur atom is attached has at least one fluoro substituent and with the proviso that said fluoro-organic thiol or sulfide does not contain any other ligating group or atom in a ligating position which will displace fluoro as a ligand, and an organometallic-reducing agent selected from the

group of borohydride and organoaluminum halides and alkoxides having the formula $R^*_mAlX_n$ wherein R^* is alkyl, aryl or arylalkyl; X is fluoro chloride, bromide, iodide or alkoxide and m is 1 or 2 and n is 3-m;

(b) fractionally distilling the reaction product of step (a) to recover a C_6 olefin fraction containing linear hexenes and branched C_6 olefins and wherein said fraction contains 70 to 82% by weight of linear hexenes; and

(c) contacting the C_6 olefin fraction of step (b) with a dimerization catalyst under dimerization conditions thereby producing a semi-linear C_{12} olefins product containing at least 60% by weight linear dodecenes and mono-branched C_{12} olefins.

4,959,492

PROCESS TO SYNTHESIZE AB-PBO MONOMER AND PHOSPHATE SALTS THEREOF

William J. Harris; Zenon Lysenko, both of Midland, and Carl W. Hurtig, Saginaw, all of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Jul. 14, 1989, Ser. No. 380,567
Int. Cl.[5] C07C *227/04*
U.S. Cl. 562—453 **34 Claims**

1. A process for synthesizing an AB-PBO monomer, said process comprising the steps of:

(1) contacting a hydroxy-ester compound comprising:

(a) an aromatic group:

(b) a hydroxy group bonded to said aromatic group; and

(c) an ester moiety having a carboxylate moiety linked to said aromatic group

with a nitrating agent under conditions such that the aromatic group is nitrated in a position ortho to the hydroxy group, in an organic solvent, which is inert with respect to all reagents under reaction conditions:

(2) converting the nitrated hydroxy-ester of step (1) to a water-soluble nitrated hydroxy-benzoate salt and dissolving said water-soluble salt in an aqueous solvent: and

(3) contacting the water-soluble salt product of step (2) with a hydrogenating agent in the presence of a transition-metal-containing hydrogenation catalyst in an aqueous solution under conditions such that the nitrate group of said water-soluble salt is hydrogenated to form an amine group.

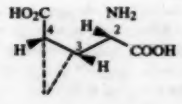
4,959,493

CARBOXYCYCLOPROPYLGLYCINE AND PROCESS FOR PRODUCING THE SAME

Yasufumi Ohfume; Keiko Shimamoto, both of Osaka, and Haruhiko Shinozaki, Omiya, all of Japan, assignors to Suntory Limited, Osaka, Japan

Filed Apr. 22, 1988, Ser. No. 184,920
Claims priority, application Japan, Jun. 30, 1987, 62-163179
Int. Cl.[5] C07C *101/20*
U.S. Cl. 562—506 **1 Claim**

1. (2S,3R,4S)-carboxycyclopropylglycine of the formula (1):



(1)

4,959,494

OXIDATION OF ORGANIC COMPOUNDS WITH PYROCHLORE CATALYSTS

Timothy R. Felthouse, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 807,010, Dec. 11, 1985, abandoned. This application Jul. 6, 1987, Ser. No. 70,091
Int. Cl.[5] C07C *51/21*
U.S. Cl. 562—515 **14 Claims**

1. A method of producing organic compounds which comprises oxidizing alcohols, olefins, alkynes, carbohydrates and carbonyl compounds by contacting said compounds with molecular oxygen in the presence of noble metal pyrochlore compounds represented by

$$A_{2+s}B_{2-x}O_{7-y}$$

where A represents pyrochlore structure metal cation, B represents pyrochlore structure metal cation, which is selected from the group consisting of one or more of Ru, Rh, Ir, Os, and Pt, and wherein each of x and y is greater than or equal to zero and less than or equal to 1.0, in the liquid phase, at temperatures up to about 200° C., for a time sufficient to convert said compounds to the organic compounds.

4,959,495

PROCESS FOR THE PREPARATION OF INTERMEDIATES USED TO PRODUCE AMINOTHIAZOLOXIMINO CEPHALOSPORINS

William V. Curran, Pearl River, N.Y., assignor to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 163,599, Mar. 3, 1988, abandoned, which is a division of Ser. No. 890,000, Jul. 29, 1986, abandoned. This application Jun. 30, 1989, Ser. No. 375,108
Int. Cl.[5] C07C *131/00*
U.S. Cl. 562—560 **1 Claim**

1. A process for producing 4-chloro-2-(Z)-methoxyimino-3-oxobutanoic acid which comprises the steps of:

(a) treating t-butyl 4-chloro-3-oxobutanoate with sodium nitrite or nitrous acid to produce t-butyl 4-chloro-2-(Z)-hydroximino-3-oxobutanoate;

(b) treating t-butyl 4-chloro-2-hydroxyinino-3oxobutanoate with dimethyl sulfate and potassium carbonate to produce t-butyl 4-chloro-2-(Z)-methoxyimino-3-oxobutanoate; and

(c) treating t-butyl 4-chloro-2-(Z)-methoxyimino-3-oxobutanoate with trifluoroacetic acid to give the desired product 4-chloro-2-(Z)-methoxyimino-3-oxobutanoic acid.

4,959,496

CHEMICAL PROCESS

Marvin M. Crutchfield; Liou-Liang Horng, both of Creve Coeur, and Robert G. Schultz, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 24, 1988, Ser. No. 235,854
The portion of the term of this patent subsequent to Aug. 21, 2007, has been disclaimed.
Int. Cl.[5] C07C *59/23*
U.S. Cl. 562—583 **49 Claims**

1. A process for preparing ether carboxylates which comprises reacting in an alkaline reaction medium the salts of maleic acid and a carboxylic or polycarboxylic acid having a reactive hydroxyl group on a non-carbonyl carbon atom in the presence of calcium ion catalyst, reducing the pH of the reaction product to a range of from about 4 to about 6 whereby unreacted starting acids are precipitated, recovering said acids from the reaction product for reuse in said process.

4,959,497

PROCESS FOR THE PRODUCTION OF WATER INSOLUBLE PEROXYCARBOXYLIC ACIDS

Manfred Dankowski, Karlstein, Fed. Rep. of Germany, assignor to Degussa Akteingesellschaft, Frankfurt am Main, Fed. Rep. of Germany

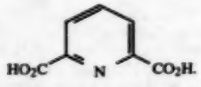
Continuation of Ser. No. 688,359, Jan. 2, 1985, abandoned. This application Apr. 27, 1989, Ser. No. 344,483

Claims priority, application Fed. Rep. of Germany, May 18, 1984, 3418450

Int. Cl.[5] **C07C** *409/00*

U.S. Cl. 562—006 **5 Claims**

1. A process for the suppression of foam in peroxycarboxylic acid forming reactions comprising carrying out the peroxidation reaction of the carboxylic acid in the presence of a foam suppression agent, wherein said peroxidation reaction comprises reacting a carboxylic acid selected from aliphatic carboxylic acids having from 6 to 16 carbons and aromatic carboxylic acids having 7 to 9 carbons, with a peroxidation mixture comprising a mixture of H_2O_2, H_2O and H_2SO_4, and wherein said foam suppression agent is 2,6-pyridine dicarboxylic acid, shown in the formula below:



and said foam suppression agent is present in the amount 0.35 to 1.6 wt % relative to the amount of H_2O_2 present.

4,959,498

PROCESS FOR THE PREPARATION OF MONOCARBOXYLIC ANHYDRIDES

Gerhard Luft, Ludwigstrasse 141a, Mühltal, and Peter Trabold, Ahornweg 19a, Dieburg, both of Fed. Rep. of Germany

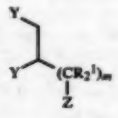
Filed Mar. 17, 1989, Ser. No. 326,607

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1988, 3811343

Int. Cl.[5] **C07C** *51/54*

U.S. Cl. 562—891 **15 Claims**

1. In a process for the preparation of monocarboxylic anhydrides of the formula $(RCO)_2O$ by reaction of a carboxylic ester or dialkyl ether of the formula RCOOR or ROR, in which R in each case denotes the same alkyl radical having 1 to 4 carbon atoms, with carbon monoxide in the gas phase in the presence of iodine or bromine or compounds containing iodine or bromine at temperatures ranging from 130° to 400° C. and pressures of 1–150 bar, the improvement which comprises using a supported catalyst having a support material of inorganic oxides, mixed oxides, or activated carbon, supporting a noble metal chelate compound and optionally a base metal chelate compound, the noble metal chelate compound comprising a noble metal compound from group VIII of the periodic table and a chelating agent having organonitrogen, organophosphorus, organoarsenic, organosulfur or mercapto groups, wherein the chelating agent is substituted in its basic structure by alkyl or aralkyl groups and has one of the following structural formulae:



(a)

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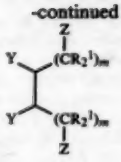


in which Y is $—NR_2^2$, a nitrogen-containing aryl radical, $—PR_2^2$, $—AsR_2^2$, $—SR^2$ or —SH;

Z is H, aryl, phenyl,

R^1 is —H, C_1 to C_3-alkyl;

R^2 is C_1 to C_6-alkyl, C_5 or C_6-cycloalkyl, $—C_6H_5$ or $C_6H_5CH_2—$;

m is 2–6.

4,959,499

LIQUID POLYMERS CONTAINING URETHANE AND UREA MOIETIES AND HYDROXYL AND/OR AMINO END GROUPS AND A PROCESS FOR THE PREPARATION THEREOF

Robert F. Harris, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 926,692, Nov. 4, 1986. This application Jan. 2, 1987, Ser. No. 227

Int. Cl.[5] **C08G** *71/00, 71/02, 71/04*

U.S. Cl. 564—59 **7 Claims**

1. A liquid polymer comprising

(1) a backbone having:

(a) at least one acyclic urethane moiety;

(b) at least one acyclic urea moiety; and

(c) at least two polyalkyleneoxy moieties; and

(2) at least two terminal groups which are primary or secondary amine, hydroxyl or a combination thereof,

wherein each urea of urethane moiety is separated from each urea or urethane moiety by a polyalkyleneoxy moiety.

4,959,500

POLYBROMINATED BIS SULFONAMIDES

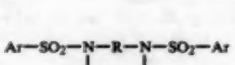
Robert A. Schleifstein, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed May 23, 1989, Ser. No. 355,558

Int. Cl.[5] **C07C** *143/78*

U.S. Cl. 564—82 **8 Claims**

1. A polybromoaromatic bis-sulfonamide containing in the molecule at least two bromoaromatic groups, from 18 to 30 carbon atoms (preferably 18 to 24), and from 6 to 14 bromine atoms substituted on the aromatic rings, said polybromoaromatic bissulfonamide being represented by the general formula



where Ar are the same or different polybromoaromatic groups, R is a divalent aromatic or bromoaromatic group, and R′ and R″ are independently hydrogen atoms, hydrocarbon groups or halohydrocarbon groups in which the halogen atoms are chlorine or bromine, the total number of bromine atoms substituted on the aromatic rings of the groups designated as Ar and R falling in the range of 6 to 14.

4,959,501

PROCESS FOR THE PREPARATION OF 2-(2-CHLOROETHOXY)-BENZENESULFONAMIDE

Reinhard G. Hanreich, Basle, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

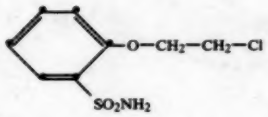
Continuation-in-part of Ser. No. 93,436, Sep. 4, 1987, Pat. No. 4,906,528. This application May 23, 1988, Ser. No. 197,480

The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.

Int. Cl.[5] C07C *143/78*

U.S. Cl. 564—89 **13 Claims**

1. A process for the preparation of 2-(2 chloroethoxy)-benzenesulfonamide of formula I

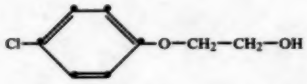


(I)

which process comprises the etherification of 4-chlorophenol of formula II

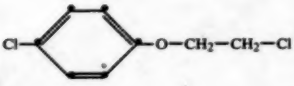
(II)

with ethylene carbonate at a temperature between +130° C. and +150° C. and chlorination of the resulting 4-(2-hydroxyethoxy)-chlorobenzene of formula III



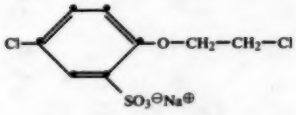
(III)

with phosgene or thionyl chloride at a temperature between +70° C. and +90° C. to give 4-(2-chloroethoxy)-chlorobenzene of formula IV



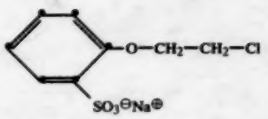
(IV)

which is converted with chlorosulfonic acid, at a temperature between −20° C. and +60° C. and subsequent neutralizaion with sodium hydroxide to the sulfonic acid sodium salt of formula V



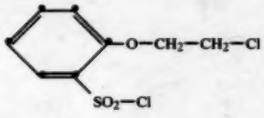
(V)

which is hydrogenated at a temperature between +20° C. and +70° C. to the compound of formula VI



(VI)

which is subsequently reacted with phosgene at a temperature between +60° C. and +120° C. to the sulfonic acid chloride of formula VII



(VII)

which is reacted with ammonia at a temperature between 0° C. and +100° C. to the sulfonamide of formula I.

4,959,502

CATALYSTS AND THEIR USE IN THE HYDROLYSIS OF NITRILES

David Farrar; Gerald P. Benn, both of Bradford, and Seraj A. M. Karolia, Batley, all of England, assignors to Allied Colloids Ltd., Great Britain

Continuation-in-part of Ser. No. 52,030, May 19, 1987, Pat. No. 4,906,776. This application Nov. 22, 1988, Ser. No. 275,529

Claims priority, application United Kingdom, Nov. 23, 1987, 8727379

The portion of the term of this patent subsequent to Mar. 6, 2007, has been disclaimed.

Int. Cl.[5] C07C *231/06, 233/09;* B01J *23/84, 25/00*

U.S. Cl. 564—127 **12 Claims**

1. A process of making an amide of the formula $RCONH_2$ where R is a hydrocarbon of 1 to 10 carbon atoms by hydrolysis of the corresponding nitrile RCN in an aqueous medium containing a copper catalyst containing vanadium, characterized in that the catalyst has been made by providing a black copper catalyst and then improving its activity by contacting it with an aqueous solution of a water soluble vanadium compound and then rinsing the catalyst with water until the catalyst is substantially free of water soluble vanadium compound.

4,959,503

DIARYLALKANOIDS HAVING ACTIVITY AS LIPOXYGENASE INHIBITORS

David T. Connor, Ann Arbor, Mich., and Daniel L. Flynn, Mundelein, Ill., assignors to Warner-Lambert Company, Morris Plains, N.J.

Continuation-in-part of Ser. No. 16,897, Mar. 3, 1987, Pat. No. 4,810,716, which is a continuation-in-part of Ser. No. 851,003, Apr. 11, 1986, abandoned. This application Nov. 2, 1988, Ser. No. 266,035

Int. Cl.[5] C07C *49/175, 251/40*

U.S. Cl. 564—265 **5 Claims**

1. 1-(3-bromo-4-hydroxy-5-methoxyphenyl)-5-phenyl-1-penten-3-one.

4. 1-(4-hydroxy-3,5-dimethoxyphenyl)-5-phenyl-1-penten-3-one, (E,E)-oxime.

ELECTRICAL

4,959,504

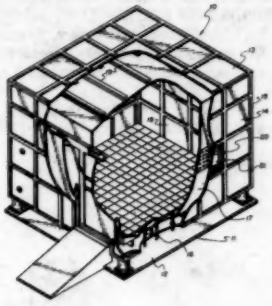
MAGNETICALLY AND RADIO FREQUENCY SHIELDED ENCLOSURE

Eric J. Yarger, Idaho Falls, Id.; Rex D. Yarger, Brigham City, Utah, and Gary D. Clegg, Idaho Falls, Id., assignors to Magnashield Technologies, Inc., Idaho Falls, Id.

Filed Nov. 22, 1988, Ser. No. 274,864

Int. Cl.[5] H05K *9/00*

U.S. Cl. 174—35 MS **12 Claims**



1. A magnetic and radio frequency-shielded room comprising, in combination:

an aluminum sheet placed upon the existing floor of the building in which the room is to be placed; an outer enclosure comprised of four walls, a ceiling, and a floor, each side of said enclosure being constructed of mumetal sheets abutted together, the seam formed by said abutting of said sheets being pressure sealed by application of a mumetal strip overlayed by an aluminum flat bar strip, both strips then being attached to said mumetal sheets by screw means screwed through mumetal sheets to underlying structural members;

a plurality of pneumatic isolators attached to the bottom of said outer enclosure raising said enclosure above said aluminum sheet;

an inner enclosure disposed within, and of less dimensions than, said outer enclosure, comprised of four walls, a ceiling, and a floor, each side of said enclosure being constructed of mumetal sheets abutted together, the seam formed by said abutting of said sheets being pressure sealed by application of mumetal strip overlayed by an aluminum flat bar strip, both strips then being attached to said mumetal sheets by screw means screwed through mumetal sheets to the underlying structural members;

a sheet of underlying structural material underlying said connected and sealed mumetal sheets of said outer enclosure and said connected and sealed mumetal sheets of said inner enclosure, said sheet of underlying structural material being screwed to said mumetal sheets;

an inner work floor comprised of layers of plywood overlayed by self adhesive tiling material;

a plurality of fiberglass dowels, the lower end of each being permanently affixed within an aluminum pipe stub permanently welded to said aluminum sheet, and the upper end of each said dowel being affixed within an aluminum pipe stub sunk into the bottom layer of said plywood of said inner floor, each dowel passing through said floor of said outer enclosure and said floor of said inner enclosure through holes drilled in said floor of said outer enclosure and through holes drilled in said floor of said inner enclosure, and through aluminum flat bar attached to and extending the length of the bottom surface of said inner floor, said holes being provided with magnetic wave guides and RF wave guides;

a crossed network of wooden beams disposed upon the upper surface of said floor of said outer enclosure separating said outer enclosure from said inner enclosure;

"I" beams welded to the upper surface of the ceiling of said inner enclosure;

a cable feed-through system comprised of a hooded plate disposed on said outer wall of said outer enclosure with honeycomb or rectangular cable feed through openings;

an enclosure vent system comprised of mumetal tube perforated mumetal plate, aluminum collar, and plastic flex hose connecting two vent subassemblies.

4,959,505

ELECTRICAL COMPONENT IN CHIP STRUCTURE AND METHOD FOR THE MANUFACTURE THEREOF

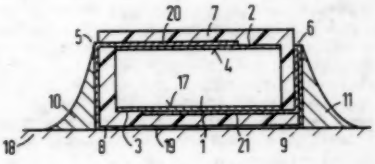
Guenter Ott, Schwanberg, Austria, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jan. 27, 1989, Ser. No. 302,682

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1988, 3804064

Int. Cl.[5] H01G *1/14;* H01C *1/14*

U.S. Cl. 174—52.2 **4 Claims**



1. An electrical component in the form of a chip structure adapted for fastening to a circuit board, comprising a wafer-shaped or lamina-shaped body (1) of material having a predetermined electrical characteristic, said body being provided with conductive coatings (2, 3) at two large end faces that lie at opposite ends of said body, a pair of ribbon-shaped terminal elements (5, 6) for connecting said coatings (2, 3) to spaced-apart contact locations (8, 9) of said component to be situated on a printed circuit board (18), and said body being pressure-coated with a lamina-shaped or cuboid insulating coat (7), characterized in that

(a) said terminal elements (5, 6) are planarly secured to the coatings (2, 3) and extend in first and second planes toward the outside of said component, through the insulating coat (7) approximately in the plane of said end faces of the body (1);

(b) outside of the insulating coat (7), that terminal element (5) which is secured to the upperside (4) of the body (1) relative to said circuit board (18) being bent off from said first plane in a downward direction, and then extending along the outer surface of said insulating coat (7) and is then bent over onto the underside (19) of said component;

(c) outside of said insulating coat (7), the terminal element (6) which is secured to the underside (17) of the body (1) is first bent off from said second plane in an upward direction, and then extends along the surface of the insulating coat (7) until it reaches approximately said first plane, and is then bent over by 180° in this level, end, lying against itself, is likewise bent over under the underside (19) of the insulating coat (7).

4,959,506

JUNCTION BOX

John Petty, Bonnet Bay, and Sandy McNeil, Hunters Hill, both of Australia, assignors to Elconnex Pty. Limited, New South Wales, Australia

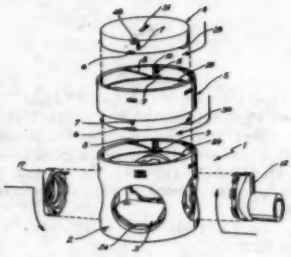
PCT No. PCT/AU87/00282, § 371 Date Apr. 11, 1988, § 102(e) Date Apr. 11, 1988, PCT Pub. No. WO88/01447, PCT Pub. Date Feb. 25, 1988

PCT Filed Aug. 21, 1987, Ser. No. 198,817

Claims priority, application Australia, Aug. 21, 1986, PH7588; May 18, 1987, PI2014

Int. Cl.[5] H02G 3/14

U.S. Cl. 174—65 R 18 Claims



1. A junction box comprising a body, a plurality of ports of the same diameter formed in the body located around the body; each port having an inwardly radially extending wall with cutouts of at least two different sizes located around the periphery thereof, and a projection extending substantially radially inwardly into said port; and

at least one connector adapted to engage in any one of said ports, each connector having: a set of castellations at or adjacent one end, and being of a size complementary to the cutouts in said ports;

an annular recess located between an abutment surface and said castellation:

resilient ramp means with a locking recess at said one end of the connectors; and

tightening means located on said castellations facing said abutment surface whereby to connect said connector to a port, the castellations are aligned with, and pushed through their respective cutouts and the connector rotated such that the said projection rides up said ramp means and engages in said locking recess, with the said annular wall being held in said annular recess and being urged into abutment with said abutment surface by said tightening means so that the connector is releasably locked against rotational and lateral movement in said port and whereby to release the connector the ramp is deflecting so as to free the said projection from said locking recess to allow for rotation and then withdrawal of the connector.

11. A junction box having a circular opening;

an annular wall extending from said opening to an inwardly projecting shoulder;

at least one recess located in said annular wall adjacent the inwardly projecting shoulder and;

a inwardly extending projection having a ramped surface and a locking recess located adjacent the projection:

a circular lid having a cylindrical outer wall with a first series of projections located thereon, a locking projection, and a recess in the lid adjacent said locking projection whereby when said lid is placed in said opening and rotated the first series of projections enter into the respective recesses holding the lid against axial movement while the locking projection rides up and over the ramped surface and locks into said locking recess locking the lid against rotational movement and whereby to remove the lid a tool is placed in the recess in the lid and the wall of the opening is deflected to allow the locking projection to disengage from the locking recess to allow removal of the lid.

4,959,507

BONDED CERAMIC METAL COMPOSITE SUBSTRATE, CIRCUIT BOARD CONSTRUCTED THEREWITH AND METHODS FOR PRODUCTION THEREOF

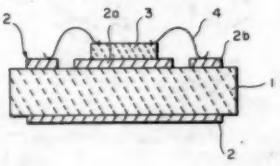
Tadashi Tanaka, Chiba; Kazuo Matsumura, Kanagawa; Hiroshi Komorita, Kanagawa, and Nobuyuki Mizunoya, Kanagawa, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 25, 1989, Ser. No. 342,843

Claims priority, application Japan, Apr. 25, 1988, 63-101681

Int. Cl.[5] H05K 1/00

U.S. Cl. 174—260 6 Claims



1. A bonded ceramic-metal composite substrate comprising a ceramic substrate having opposite surfaces and a copper sheet having one face directly bonded to one of the surfaces of the ceramic substrate, wherein the median surface roughness (R_a) of the outer surface of the copper sheet is not greater than 3 μm, and the maximum surface roughness (R_{max}) of the outer surface of the copper sheet is not greater than 18 μm.

4,959,508

SUBMERSIBLE SPLICE APPARATUS

Eugene W. McGrane, Ormond Beach, Fla., assignor to Homac Mfg. Company, Ormond Beach, Fla.

Filed Aug. 4, 1989, Ser. No. 389,478

Int. Cl.[5] H01R 4/20

U.S. Cl. 174—84 C 4 Claims

1. Submersible splice apparatus for interconnecting insulated cables, said apparatus comprising

a deformable metal splice having a predetermined longitudinal length;

a radial rib integral with and extending outwardly from said splice, said rib being located substantially centrally on said splice;

a resilient splice cover slidably secured about and removable from said deformable splice, said splice cover having a longitudinal length greater than the longitudinal length of said splice and having an internal diameter smaller than the external diameter of said splice so as to ensure an interference fit about said splice; and

a recess extending outwardly from the interior of said splice cover, said recess having an interior dimension substantially the same as the exterior dimension of said radial rib on said splice and receiving said radial rib therein, said recess being located substantially centrally in said splice cover.

4,959,509

GROMMET ASSEMBLY FOR MAIN AND AUXILIARY WIRE HARNESSES

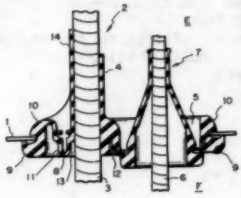
Hideharu Takeuchi, Aichi, and Tsutomu Sakata, Mie, both of Japan, assignors to Sumitomo Wiring System, Ltd., Yokkaichi, Japan

Filed Dec. 26, 1989, Ser. No. 456,749

Claims priority, application Japan, Dec. 27, 1988, 63-168484[U]

Int. Cl.[5] H01B 17/26; H02G 3/22

U.S. Cl. 174—153 G 1 Claim



1. A grommet assembly comprising a main grommet unit provided with a portion through which a main wire harness is to be put, said main grommet unit comprising a thick large diameter tubular portion and a thin small diameter tubular portion, said main grommet unit being further characterized in that an opening is formed in a part of a flange portion including said large diameter tubular portion; a separate grommet unit also comprising a thick large diameter tubular portion and a thin small diameter tubular portion fitted into said opening; and a hard plate embedded in that part of said flange portion confronting the outer periphery of said opening.

4,959,510

PRINTED CIRCUIT BOARD

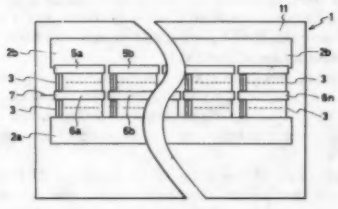
Yoshiki Matsusaka, and Susumu Ushiki, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed May 19, 1989, Ser. No. 354,221

Claims priority, application Japan, May 25, 1988, 63-125797

Int. Cl.[5] H05K 1/00

U.S. Cl. 174—261 8 Claims



1. A printed circuit board adapted for mounting devices thereon, comprising:

a glass sheet;

a power supply conductor, mounted on said glass sheet in a power supply conductor region thereof, for conducting power for the devices;

bonding pads mounted on said glass sheet in bonding pad regions thereof;

signal line conductors, mounted on said glass sheet in signal line conductor regions thereof, for conducting signals for the devices;

said power supply conductor, said bonding pads and said signal line conductors each comprise a first layer of a thin film of indium-tin oxide or tin oxide formed on said glass sheet in said power supply conductor region, said bonding pad conductor regions and said signal line conductor regions, respectively;

said power supply conductor and said bonding pads each further comprise a second layer of conductive metal formed on said first layer in said power supply conductor region and said bonding pad regions, respectively; and

said power supply conductor further comprises a third layer of a relatively thick conductive metal formed on said second layer in said power supply conductor region.

7. A method of producing a printed circuit board, adapted for mounting devices thereon and comprising a glass sheet, a power supply conductor mounted on the glass sheet in a power supply conductor region thereof for conducting power for the devices, bonding pads mounted on the glass sheet in bonding pad regions thereof, and signal line conductors mounted on the glass sheet in signal line conductor regions thereof for conducting signals for the devices, comprising the steps of:

providing the glass sheet;

forming a thin film of indium-tin oxide or tin oxide on the glass sheet in the power supply conductor region, the bonding pad regions and the signal line conductor regions;

forming a first metal plating layer on said thin film in the power supply conductor region and the bonding pad regions; and

forming a metal paste layer or a second, relatively thick, metal plating layer on said first metal plating layer in the power supply conductor region.

4,959,511

PEN CORD TENSIONING DEVICE

Graham P. Lloyd, Fremont, and Dennis R. Mitchell, San Jose, both of Calif., assignors to Grid Systems, Fremont, Calif.

Filed Jun. 12, 1989, Ser. No. 364,924

Int. Cl.[5] G08C 21/00

U.S. Cl. 178—18 15 Claims

1. An electrical conductor tensioning apparatus comprising a first electrical conductor;

a device in electrical communication with the electrical conductor, the electrical conductor having a point which is a first predetermined distance from the device;

means for allowing the point on the electrical conductor to be moved a second predetermined distance away from the device without breaking the electrical communication between the electrical conductor and the device, said means for allowing comprising a spring in electrical communication with the electrical conductor and with the device.

4,959,512

APPLIANCE TIMER WITH IMPROVED TERMINAL ASSEMBLY

Ronald E. Cole, Greenwood; Daniel K. Amonett, and Steven W. Smock, both of Indianapolis, all of Ind., assignors to Emhart Industries Inc., Towson, Md.

Filed Mar. 29, 1989, Ser. No. 330,159

Int. Cl.[5] H01H 43/10, 1/58; H01R 9/00, 29/00

U.S. Cl. 200—38 R 10 Claims

1. An appliance timer comprising:

a motor-driven cam;

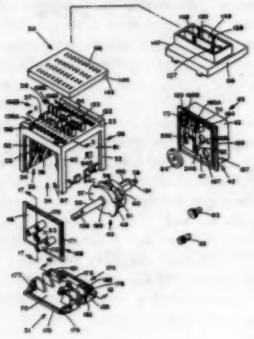
electrical switches responsive to said cam, each of said switches comprising a pair of contacts;

a plurality of electrical terminals for selective connection to

circuits in the appliance, at least one of which is electrically connected to at least one of said switches;

housing means for supporting said cam, said switches, and said terminals;

said terminals defining n rows of terminals where n is 2 or more, each row having at least one terminal in it, and m of



said rows of terminals containing a plurality of longer terminals which extend further from said housing in a predetermined direction than terminals in the other rows of said terminals, m being less than n and at least one; and

cover means for covering said other rows of terminals while leaving said longer terminals in said m rows exposed.

4,959,513

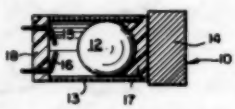
MAGNETICALLY BIASED DEVICE INCORPORATING A FREE MACHINING, NON-MAGNETIC, AUSTENITIC STAINLESS STEEL

Gunvant N. Maniar, Bern Township, Berks County, Pa., assignor to Carpenter Technology Corporation, Reading, Pa.

Filed Nov. 3, 1989, Ser. No. 431,480

Int. Cl.[5] H01H *35/14*

U.S. Cl. 200—61.45 M **6 Claims**



1. In a magnetically biased accelerometer having a tube and a magnetically biased movable member positioned within said tube in close spaced relation to the interior wall thereof, said tube being formed of an alloy consisting essentially of, in weight percent, about

	w/o
C	0.04–0.10
N	0.03–0.07
Mn	2.00 max.
Si	1.00 max.
P	0.045 max.
S	0.015–0.10
Cr	19.00–24.00
Mo	0.75 max.
Ni	12.00–18.00

the balance essentially iron; said tube containing no more than about 2 v/o ferrite as determined by the DeLong diagram, said tube having a coefficient of thermal expansion of about 14.5×10^{-6} to 16.5×10^{-6} per °C. within the temperature range of about −51° to 121° C.

4,959,514

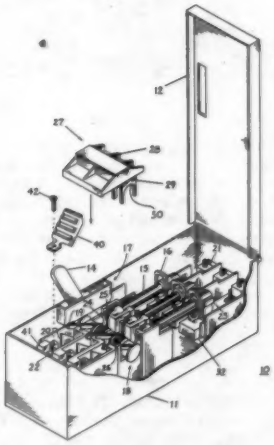
FUSIBLE ELECTRIC SWITCH

Dean A. Robarge, New Britain; John A. Morby, Farmington; Andre J. M'Sadoques, Southington, and Robert G. Markowski, Wallingford, all of Conn., assignors to General Electric Company, New York, N.Y.

Filed Sep. 11, 1989, Ser. No. 405,172

Int. Cl.[5] H01H *33/08*

U.S. Cl. 200—144 R **14 Claims**



1. An electric fused disconnect switch comprising:

an enclosure including a metallic case and cover, said cover being hingeably connected to said as to define a switch interior;

a pair of line terminals at one end of said case for connection with an electric power distribution circuit and a pair of load terminals at an opposite end of said case for connection with an associated load;

an operating mechanism and a rotor within said case and arranged for moving a plurality of contact blades between closed and open positions within a corresponding plurality of contact stabs under the urgence of an operating handle;

a plurality of arc chutes arranged for cooling and extinguishing arcs that occur when said contact blades and stabs become connected ad disconnected while said line lugs are connected with siad power distribution circuit;

an insulative arc gas controller arranged over said arc chutes, said arc gas controller having sealing means for sealing arc-generated gases from said interior and exhaust means for exhausting said gases in a predetermined direction outside said interior; and

a first insulative base proximate said line terminals and arranged under said arc gas controller, said sealing means comprising first and second projections extending from said arc gas controller on opposite sides of said rotor and corresponding first and second barriers formed within said insulative base on siad opposite side, siad first and second projections being received within said first and second barriers.

4,959,515

MICROMECHANICAL ELECTRIC SHUNT AND ENCODING DEVICES MADE THEREFROM

Paul M. Zavracky, Norwood, and Richard H. Morrison, Jr., Taunton, both of Mass., assignors to The Foxboro Company, Foxboro, Mass.

Division of Ser. No. 606,065, May 1, 1984, Pat. No. 4,674,180. This application Feb. 6, 1987, Ser. No. 12,092

Int. Cl.[5] H01H 57/00

U.S. Cl. 200—181 31 Claims

1. Micromechanical shunt exhibiting hysteresis, comprising:
(a) an insulating substrate having a planar top surface;
(b) a first contact terminal on said planar top surface;
(c) a second contact terminal on said planar top surface;
(d) a cantilever beam having a free end and a fixed end which is attached to said first contact terminal, said free end being suprajacent said second contact terminal;
(e) means for establishing an electrostatic charge attraction between said cantilever beam and said second contact terminal; and
(f) a resistance layer intermediate said cantilever beam and said second contact terminal;
whereby said free end of said cantilever beam may be deflected toward said second contact terminal by establishing an electrostatic charge between said first and second contact terminals.

4,959,516

SUSCEPTOR COATING FOR LOCALIZED MICROWAVE RADIATION HEATING

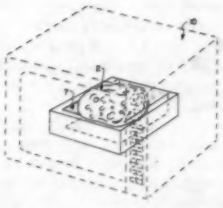
Laurence E. Tighe, Milford, and Tim Parker, Shrewsbury, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.

Continuation-in-part of Ser. No. 304,734, Jan. 31, 1989, Pat. No. 4,876,423, which is a continuation-in-part of Ser. No. 194,260, May 16, 1988, Pat. No. 4,864,089. This application May 9, 1989, Ser. No. 348,012

The portion of the term of this patent subsequent to Oct. 24, 2006, has been disclaimed.

Int. Cl.[5] H05B 6/80

U.S. Cl. 219—10.55 F 13 Claims



1. A microwave susceptor coating panel which comprises a heat resistant substrate and a susceptor coating on said substrate;
said susceptor coating comprising a combination of metallic particles and galvanic couple alloy particles, and a heat resistant polymeric binder wherein said coating converts microwave radiation to heat sufficient to cause heating to a temperature of at least 350° F. (177° C.) within about 4 minutes at a conventional microwave power output level of 700 watts at a frequency of 2450 Megahertz.

4,959,517

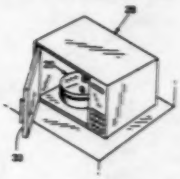
MICROWAVE COOKING ASSEMBLY OF A MIXING BOWL, LOCKABLE TOP ASSEMBLY, SUPPORTING A STIRRER POWER ASSEMBLY

Janeice A. Jump, P.O. Box 1281, Ellensburg, Wash. 98926, and Thomas E. Hale, 9095 SW. Taylor, Portland, Oreg. 97225

Filed Jan. 12, 1989, Ser. No. 296,515

Int. Cl.[5] H05B 6/78

U.S. Cl. 219—10.55 E 24 Claims



1. A microwave cooking assembly comprising:
(a) a mixing bowl
(b) a cover on said mixing bowl; and
(c) a self-contained stirrer power assembly in said cover,
(d) a stirring blade assembly depending from said stirrer power assembly and projecting into said bowl for wiping and mixing functions in said bowl,
(e) said mixing bowl, cover, stirrer power assembly and said stirring blade assembly "being independent of and freely movable into and out of a microwave oven and " comprising heat resistant plastic materials capable of operating up into the range of 300 to 375 degrees Fahrenheit and being compatible with microwave use,
whereby foods in said bowl are capable of being cooked in a microwave oven and simultaneously stirred.

4,959,518

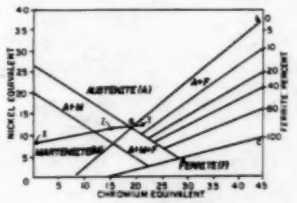
METHOD OF WELDING STAINLESS STEEL STUDS

Samuel D. Reynolds, Jr., Oviedo, Fla., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 30, 1989, Ser. No. 359,020

Int. Cl.[5] B23K 9/20

U.S. Cl. 219—99 10 Claims



1. A method for stud welding stainless steel studs to carbon steel or low alloy steel components and producing a ductile weld therebetween, comprising:
determining the chromium equivalent and nickel equivalent contents of the steel component;
providing a stainless steel stud having a chromium equivalent and nickel equivalent content which, upon stud welding thereof with dilution by the steel from said steel component, will provide a structure of austenite plus ferrite in said resulting structure; and
welding said stainless steel stud to said steel component such that the weld metal, on admixture of the stud metal and the steel component metal, will produce a structure of austenite and ferrite in the resulting weld structure and thus a ductile weld between said stud and said component.

4,959,519

CONTROLLED PRESSURE BUTT WELDING PROCESS AND APPARATUS FOR CARRYING IT OUT

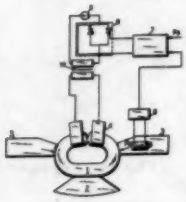
Karl-Christoph Exner; Franz Reichow, and Horst Becker, all of Köln, Fed. Rep. of Germany, assignors to Meyer, Roth & Pastor Maschinenfabrik GmbH

Filed Feb. 23, 1989, Ser. No. 315,418

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1988, 3806246

Int. Cl.[5] B23K *11/02*

U.S. Cl. 219—110 **7 Claims**



1. A pressure butt welding process for welding chain links bent from round wire, comprising the steps of:

pressing together areas of a workpiece to be welded with upsetting dies which are moved in a controlled manner by continuous cam disks;

measuring pressure forces exerted on the workpiece areas by the upsetting dies;

applying a welding voltage to the workpiece; and

continuously adjusting the welding voltage as a function of the measured pressure forces.

4,959,520

DETECTION MEANS FOR AN ELECTRIC ARC TORCH NOZZLE

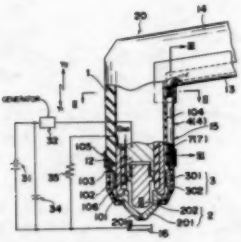
Toshihiko Okada, Takatsuki, and Masanobu Uchida, Suita, both of Japan, assignors to Daihen Corporation, Osaka, Japan

Filed Feb. 9, 1989, Ser. No. 308,440

Claims priority, application Japan, Feb. 15, 1988, 63-18542[U]; May 20, 1988, 63-67109[U]

Int. Cl.[5] B23K *9/00*

U.S. Cl. 219—121.48 **3 Claims**



1. Electric arc torch having detection means for an electric torch nozzle, said electric arc torch having a handle portion and an end portion, said handle portion axis and said end portion axis crossing at a predetermined angle, said end portion having a power feeding member and a nozzle covering the power feeding member, said power feeding member and said nozzle being arranged coaxially on said end portion of the torch, said nozzle being provided with a pair of detection means for detecting a mounted and dismounted state of said nozzle, said detection means having a detection pin being slidable in parallel with the axis of said power feeding member, said detection means further having a compression spring for biasing said detection pin, said detection means comprising:

a pair of holders for holding respective detection means formed separately from said end portion of the torch;

two grooves for containing said two holders therein formed on the periphery of said end portion at positions not included in a plane including the axis of said end portion which is perpendicular to a plane including both axes of said handle portion and said end portion, each said groove extending in the axial direction of said end portion; and

a cover member for covering at least upper end portions of said pair of holders fitted into said grooves to fix said pair of holders, said cover member being detachably fixed to said end portion of the torch.

4,959,521

METHOD AND APPARATUS FOR FASTENING PARTS SECURELY IN PLACE USING A BAND

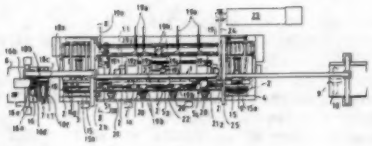
Iwao Maruyama, and Kimitake Uzuyama, both of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 31, 1989, Ser. No. 401,253

Claims priority, application Japan, Sep. 8, 1988, 63-223443; Sep. 8, 1988, 63-223444

Int. Cl.[5] B23K *26/00*

U.S. Cl. 219—121.63 **6 Claims**



1. A method of fastening parts securely in place by a band comprising winding a band around each of tight-binding portions of a plurality of parts fitted over an article to which said parts are to be fastened using a band winding device and applying a laser beam emitted from a laser beam irradiation head to an overlapped portion of both ends of the band for welding thereof, said method further comprising the steps of:

conveying the article successively to a plurality of working stations, each equipped with a band winding device, and performing at each of the working stations the band-winding for each of the predetermined tight-binding portions of the parts; and

dividing a plurality of band winding devices disposed at said working stations into at least two groups, one comprising those in front along the conveying direction in which the article is conveyed and the other comprising those in the rear, providing one laser beam irradiation head per group of band winding devices, moving the laser beam irradiation head provided to each group successively to each of a plurality of positions at which it is aligned with one of the band winding devices belonging to the corresponding group so as to be prepared for welding of the band, wherein said movement of one of the laser beam irradiation heads is alternated with that of the other one and, while said one laser beam irradiation head is being moved, leading a laser beam emitted from a common laser generator into the other laser beam irradiation head to carry out the welding.

4,959,522

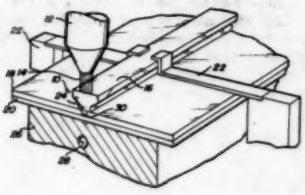
TRANSPARENT PRESSURE FOOT

Cristiano Rossi, Birmingham, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jan. 12, 1990, Ser. No. 464,266

Int. Cl.[5] B23K *26/06*

U.S. Cl. 219—121.75 **10 Claims**



1. An apparatus for applying laser energy having a predetermined frequency band to a material, said apparatus comprising:

a foot means for receiving and transmitting said laser energy to said material, said foot means having a contour surface for directing and concentrating portions of said laser energy received by said foot toward said material, said contour surface comprising side portions of said foot means and having generally the shape of a parabola in cross section, said contour surface including a reflective coating, said foot means being substantially transparent to said predetermined frequency band;

said foot means having a top surface for receiving said laser energy, and a bottom surface for making contact with said material, said bottom surface having a contour that conforms to a desired contour for said material wherein said laser energy exits said foot means through said bottom surface; and

clamping means associated with said foot means for positioning said foot means in contact with said material and exerting a predetermined force thereon.

4,959,523

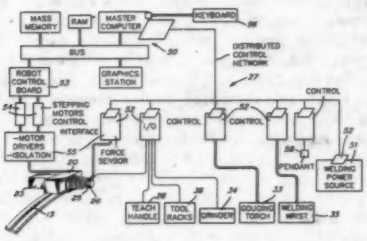
METHOD AND APPARATUS FOR AUTOMATICALLY SENSING THE CONFIGURATION OF A SURFACE AREA AND EFFECTING A WORK FUNCTION THEREON

Jean-Luc Fihey, Ste. Julie; Bruce Hazel, Montreal; Antonio Di Vincenzo, Ville d'Anjou; Mark Tinkler, Toronto, and Scott McNabb, Crescent Etobicoke, all of Canada, assignors to Hydro-Quebec, Quebec and Ontario Hydro, Ontario, both of, Canada

Filed Nov. 18, 1988, Ser. No. 273,075

Int. Cl.[5] B23K *9/12*

U.S. Cl. 219—124.34 **28 Claims**



1. An apparatus for automatically sensing the configuration of a damaged surface area and being provided an arc gouging tool, a welding tool, and a grinding tool whereby to gouge damaged areas and fill same with weld material to at least the surface profile of said surface in said working environment and grinding said filled areas flush with said surface of said working environment, said apparatus comprising a track, bendable to a profile enabling the apparatus to work without any collision with its environment while keeping full access to the work area, the geometry of said track being generally unknown to the control circuit of the robot, a motor-actuated robot member connectible to said track, said robot member having a motorized element provided with track coupling means engaged with said track for displacing said robot member at a predetermined base and position along said track, a working arm displaceably coupled to said robot member, said working arm having one or more working tools connectible thereto, a control circuit associated with said robot member for displacing same and operating said working arm and tool, a sensor connected to said working arm and having a probe to sense a distance which is measured along a normal of said surface or any surface calculated by said control circuit assumed to be representative of said surface in a delineated working environment of said robot member and working arm, said sensory feeding information data of said X and Y and Z coordinates to said control circuit to determined the geometry of the surface of said working environment and contour of areas in said working environment requiring a work procedure to be effected by said one or more working tools.

4,959,524

APPARATUS AND EVAPORATOR FOR METALLIZING FOILS

Andre de Rudnay, 16 chemin de Renens, 1004 Lausanne, CH, Switzerland

Filed May 18, 1988, Ser. No. 195,519

Claims priority, application Fed. Rep. of Germany, Sep. 20, 1986, 3632027

Int. Cl.[5] C23C *14/26*

U.S. Cl. 219—275 **10 Claims**

1. An evaporator especially for directing and condensing on a moving substrate high energy vapor beams of reactive metals, comprising in combination

a hollow body having at least one opening shaped to substantially compress into a beam all vapor produced by said evaporator,

within said hollow body, a container for holding liquid evaporant, said container being made of a photon absorbing and chemically resistant material,

also within said hollow body, a radiation heater for heating said liquid evaporant indirectly through contact with said photon absorbing contained, and also directly, through direct photon absorption,

the improvement wherein said evaporator comprises means for substantially distributing said liquid evaporant also directly heated by photon absorption, into a plurality of photon absorbing small containers shaped as capillaries, whereby said liquid evaporant is held by capillary forces in any convenient position and is more efficiently heated to fast evaporation through increased heat transmission due to the increased container/liquid interface, the capillaries being positioned around said radiation heater, whereby said vapor releasing capillaries are simultaneously useful as partial heat insulators.

4,959,525

APPARATUS FOR HEATING AN ELECTRICALLY CONDUCTIVE FLOWABLE MATERIAL FLOWING THROUGH A PIPELINE

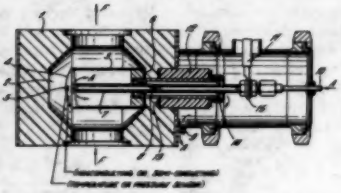
Robert Stirling, Merseyside, and Steven A. Coombes, Crawley, both of England, assignors to Electricity Association Services Limited and APV U.K. Limited, both of, United Kingdom, part interest to each

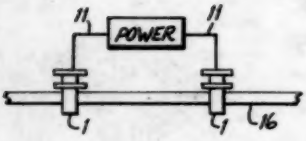
Filed Feb. 7, 1989, Ser. No. 307,394

Claims priority, application United Kingdom, Feb. 9, 1988, 8802957

Int. Cl.[5] H05B 3/60, 1/02; A23L 3/32; F24H 1/10

U.S. Cl. 219—291 9 Claims





1. Heating apparatus for heating an electrically conductive flowable medium, comprising a pipe through which, in use, a medium to be heated flows, the pipe having an electrical conductivity no greater than that of the medium; at least two heating electrodes arranged at spaced locations along the pipe and each having a surface exposed to the medium flowing in the pipe; and supply means for applying an alternating electrical supply across the heating electrodes such that an alternating current flows in the medium between the electrodes and heats the medium, in which apparatus each heating electrode is cylindrical and is arranged in the pipe with its axis transverse to the direction of flow of the medium in the pipe, and has only one end secured to the wall of the pipe whereby the heating electrode is supported by the wall of the pipe in the manner of a cantilever beam with its other end spaced from the inner surface of the pipe, electrical connection to each heating electrode being made through the wall of the pipe, and in which the connection of each heating electrode to the wall of the pipe is sealed with a flat faced aseptic seal formed between a flat end face of the cylindrical electrode and a cooperating flat face of the pipe wall.

4,959,526

STORAGE TYPE ELECTRIC WATER HEATER HAVING A CLOSED CIRCULATION LOOP WITH A BUBBLE PUMP

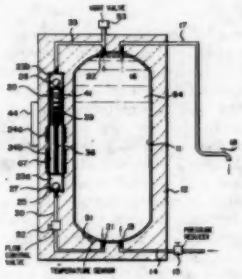
Yasuhiko Kurachi, Aichi; Kazumi Mori, Okazaki, and Hisao Koizumi, Zushi, all of Japan, assignors to Chubu Electric Power Company, Inc., Nagoya and Kabushiki Kaisha Toshiba, Kawasaki, both of, Japan

Continuation-in-part of Ser. No. 69,229, Jul. 2, 1987, Pat. No. 4,818,845. This application Sep. 21, 1988, Ser. No. 247,274

Claims priority, application Japan, Jul. 3, 1986, 61-154978; Sep. 21, 1987, 62-236859

Int. Cl.[5] H05B 1/02; F24H 1/10, 1/18

U.S. Cl. 219—314 21 Claims



1. A hot water boiling apparatus comprising:

a hot water tank having an upper end formed with a hot water supply port and a lower end formed with a water supply port, said tank containing water therein;

a hot water supply pipe connected to the hot water supply port, for discharging the hot water from the tank to the outside;

water supply means connected to the water supply port, for feeding water into the hot water tank; and

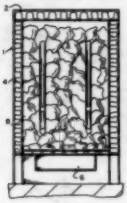
bubble pump means arranged external of said hot water tank, for feeding hot water into the upper portion of the hot water tank after sucking the water from the lower portion of the inside of the tank and heating the sucked water, said pump means including a body having a boiling chamber, heating means for heating water in the boiling chamber and generating steam bubbles in the water, a first connecting pipe for guiding the water from the lower portion in the hot water tank to the body, a guide pipe for feeding the water, guided through the first connecting pipe, into the boiling chamber and condensing said steam bubbles by the water fed through the guide pipe, a second connecting pipe for guiding the water heated in the boiling chamber into the upper portion in the hot water tank, and first and second regulating means arranged in the first and second connecting pipes, for allowing the water to flow only from the lower portion of the hot water tank toward the upper portion thereof, said guide pipe being so arranged with respect to said pump means body that heat is exchanged between the water in the boiling chamber and the water flowing through the guide pipe to preheat the water prior to entry thereof into the boiling chamber.

4,959,527

ELECTRIC SAUNA HEATER

Antti Kivimaa, Kaunisinen, and Reijo Perilii, Hangonkylii, both of Finland, assignors to Oy Helo-Tehtaat-Helo Factories, Ltd., Helsinki, Finland

Filed Dec. 30, 1988, Ser. No. 292,230
Claims priority, application Finland, Dec. 31, 1987, 875786
Int. Cl.[5] F24H 7/06; A61H 33/06
U.S. Cl. 219—365 13 Claims



1. An electric sauna heater for sauna rooms comprising, in combination:

an outer casing having thermally insulated side walls and a thermally insulated top wall defining a space for containing heat-storing material and substantially tightly surrounding said space at least on the sides and at the top;

a heat-storing material contained in said space;

at least one electric resistor disposed within said space in contact with at least some of said heat-storing material for heating the heat-storing material;

means for effecting application of electric power from a power supply to said at least one resistor in dependence on the temperature within said space for maintaining a constant temperature in said space;

means for forming, when desired, a path for air to flow between said space and the room in which the sauna heater is positioned for transferring heat from said space into said room for warming up and making said room ready for a sauna bath; and

switching means separate from said means for effecting application of electric power operative responsively to operation of said means for forming a path for the flow of air for connecting safety device means in circuit with said at least one resistor for preventing overheating of the sauna room.

4,959,528

ELECTRICALLY HEATED VESSEL AND BASE UNIT FOR USE IN A MOTOR VEHICLE

John R. Malloy, 2516 SW. Burnett Rd., Topeka, Kans. 66694

Continuation of Ser. No. 86,963, Aug. 19, 1987, abandoned. This application Mar. 2, 1989, Ser. No. 318,116
Int. Cl.[5] H05B 1/00, 1/02; A47J 41/00; F24H 1/06
U.S. Cl. 219—432 8 Claims

1. A self-heating container assembly comprising:

an elongated, hand-portable vessel having an outer wall, a chamber therein, and a lower portion including a bottom;

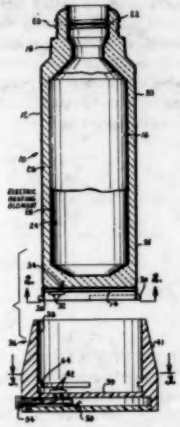
a liner in said vessel chamber, said liner being provided with an electric heating element and defining an inner chamber adapted to receive the material to be heated;

insulation between said outer wall and said liner sufficient to maintain the temperature of the material to be heated at a desired temperature;

first electrical contacts on said bottom with electrical lead means interconnecting said contacts and said heating element;

a detachable, tubular base having an open upper end and a closed lower end, and presenting a tubular socket for coaxially and telescopically rotatably receiving a substantial portion of a longitudinal extent of said lower portion of said vessel, with said lower portion spaced apart from an inner wall of said socket of said base when received therein and adapted to provide clearance for said vessel when said vessel is positioned within said socket, said socket having second electrical contacts therein registering with said first electrical contacts when said lower portion of said vessel is received by said socket;

means for connecting said second electrical contacts with a power source; and



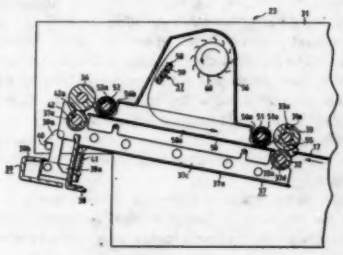
interengageable locking parts on said bottom of said vessel and said base for securing the same together upon said vessel bottom being received in said base and said bottom and said base being rotated coaxially relative to each other, whereby said vessel may be selectively interlocked within said base with said first and second contacts engaged to energize said heating element and maintain the vessel contents in a heated condition.

4,959,529

SHEET HEATING DEVICE

Yumio Matsumoto, Kasugai; Yasuo Kimura, Ichinomiya; Osamu Takagi, and Takatoshi Takemoto, both of Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 24, 1989, Ser. No. 425,940
Claims priority, application Japan, Oct. 31, 1988, 63-142147[U]; Oct. 31, 1988, 63-142148[U]; Oct. 31, 1988, 63-142153[U]; Jan. 27, 1989, 1-8871[U]; Jan. 27, 1989, 1-8872[U]
Int. Cl.[5] G03G 15/20
U.S. Cl. 219—388 18 Claims



17. A sheet heating device comprising:

a delivery means for delivering a piece of sheet, said delivery means including a first delivery means located on an up-

stream side and a second delivery means located on a downstream side for defining a delivery path of said sheet, and a guide plate;

a heating means for heating the sheet on said delivery path;

a heat insulating means for preventing a temperature increase of said delivery means due to heat of said heating means, said heat insulating means including a first heat insulating member for heating insulating said first delivery means and a second heat insulating member for heat insulating said second delivery means wherein a distance between said first heat insulating member and said guide plate is smaller than a distance between said second heat insulating member and said guide plate; and

a covering means for substantially hermetically covering said heating means in cooperation with said heat insulating means.

4,959,530

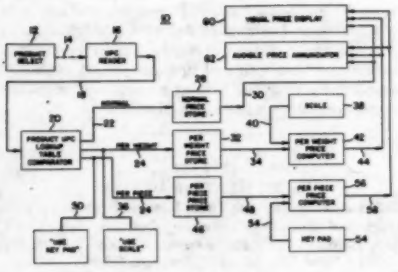
ARTICLE PRICE INDICATOR

David F. O'Connor, Delray Beach, Fla., assignor to Checkrobot Inc., Deerfield Beach, Fla.

Filed Mar. 7, 1989, Ser. No. 320,236

Int. Cl.[5] G06K *19/06*

U.S. Cl. 235—383 **16 Claims**



1. In combination, in a system for providing output indication prior to actual purchase of the price of articles bearing universal product code (UPC) indication and selected for purchase:

(a) reader means for reading article UPC indication and generating output signals indicative thereof;

(b) comparator means for receipt of the reader means output signals and for providing at least first and second output signals upon respective determinations that such received signals are indicative of an article retailed by bulk weight pricing or an article retailed per piece pricing;

(c) scale means accessible to a customer for weighing said articles and generating output signals indicative of the weight thereof;

(d) numeric entry means accessible to a customer for entering the numbers of pieces of said selected articles and generating output signals indicative of such entered numbers; and

(e) display means accessible to the customer and responsive to said first and second comparator means output signals respectively to provide indication to the customer for usage of said scale means or said numeric entry means.

4,959,531

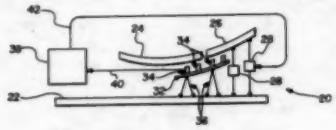
ALIGNMENT SENSING AND CORRECTING ASSEMBLY FOR AN OPTICAL ELEMENT

Philip F. Marino, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sep. 29, 1989, Ser. No. 414,558

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.9 **8 Claims**



1. In an optical system comprising:

a. a base structure;

b. at least two optical elements; and

c. a plurality of displacement actuators for positioning at least one of the optical elements to the base structure in accordance with a known displacement matrix [D], so that the optical elements define a first curvature profile;

an assembly comprising:

(1) a plurality of sensing means (a) positioned in accordance with a known position matrix [P] which is calculated based upon the Position of each of the sensing means with respect to each of the optical elements; the sensing means (b) sensing changes in the first curvature profile, due to arbitrary inputs to the optical system; and providing a corresponding plurality of sensing output signals [S]; and

(2) a computation means for:

(a) inputting the plurality of sensing output signals [S];

(b) inputting the position [P] and displacement matrices [D]; and

(c) computing, on the basis of the sensing output signals [S], and the position [P] and displacement [D] matrices, at least one displacement actuator command [C],

whereby, a realization of displacement actuator re-positioning, in accordance with the or each displacement actuator command [C], restores the system first curvature profile.

4,959,532

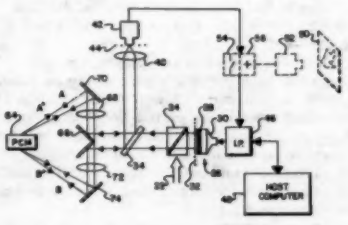
OPTICAL NEURAL NETWORK AND METHOD

Yuri Owechko, Newbury Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed Feb. 16, 1989, Ser. No. 311,495

Int. Cl.[5] G01J *1/20*

U.S. Cl. 250—201.9 **39 Claims**



1. An optical neural network, comprising:

means for presenting a pixelized input optical pattern,

means for receiving a pixelized output optical pattern,

a phase conjugate mirror (PCM) for both phase conjugation and routing and for storing optical transmission weightings between the pixels of the input and output

patterns as angularly and spatially distributed gratings within the PCM, and

optical transmission means directing a pixelized input beam from the input pattern to the PCM and a phase conjugate of the input beam returned from the PCM as said pixelized output optical pattern.

4,959,533

PHOTOSENSITIVE SEMICONDUCTOR CONTACT IMAGE SENSOR

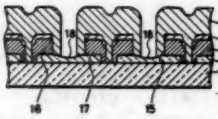
Shunpei Yamazaki, Tokyo; Takeshi Fukada, Ebina; Mitsunori Sakama, Hiratsuka; Hisato Shinohara, Sagamihara; Nobumitsu Amachi, Atsugi; Naoya Sakamoto, Atsugi, and Takashi Inuzima, Atsugi, all of Japan, assignors to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

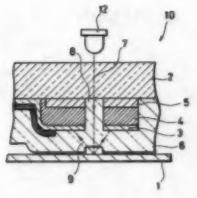
Filed Oct. 18, 1988, Ser. No. 259,522

Claims priority, application Japan, Oct. 21, 1987, 62-266098; Oct. 21, 1987, 62-266099; Oct. 21, 1987, 62-266100

Int. Cl.[5] H01L *27/14, 31/00*

U.S. Cl. 250—208.1 **3 Claims**





1. An image sensor comprising:

a light source;

a transparent substrate located in order to receive light rays from said light source;

a photosensitive semiconductor film formed on said substrate with a pair of electrodes in contact with opposed surfaces of said semiconductor film, one electrode of said pair being light blocking and located between said light source and said semiconductor film, and the other electrode being transparent;

a light window opened in said photosensitive film in order to be defined and interposed between two portions of said light blocking electrode; and

means for scattering at least some of the light rays that pass through said light window, said means including an uneven interface at a location along the path of light rays incident on said sensor.

4,959,534

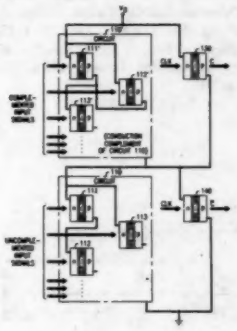
DIFFERENTIAL OPTICAL LOGIC ARRANGEMENT

Anthony L. Lentine, St. Charles, Ill., and David A. B. Miller, Fairhaven, N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 28, 1989, Ser. No. 399,730

Int. Cl.[5] H01J *40/14*

U.S. Cl. 250—213 A **17 Claims**



1. Apparatus comprising

first and second electrical circuits connected in series for connection across a voltage source,

said first circuit being responsive to a plurality of optical signal beams and comprising a plurality of photodetector means each having at least one of said optical signal beams incident thereon and being interconnected such that said first circuit corresponds to a logic function of said plurality of optical signal beams,

said second circuit being responsive to a plurality of beams each complementary to one of said optical signal beams and comprising a plurality of photodetector means each having at least one of said complementary beams incident thereon and being interconnected as a conduction complement of the connections of said first circuit.

4,959,535

OPTICAL RECEIVER CIRCUIT INCLUDING A FILTER NETWORK TO MINIMIZE NOISE

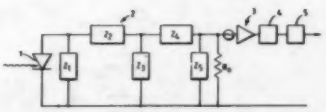
Ian Garrett, Ipswich, England, assignor to British Telecommunication, Great Britain

Continuation of Ser. No. 314,760, Feb. 2, 1989, abandoned. This application Oct. 10, 1989, Ser. No. 418,976

Claims priority, application United Kingdom, Jun. 11, 1987, 8713699

Int. Cl.[5] H01J *40/14*

U.S. Cl. 250—214 R **14 Claims**



1. A receiver circuit for receiving a modulated optical signal and for generating a corresponding electrical signal, the circuit comprising a photodetector acting as a current source for generating a first modulated electrical signal; an amplification circuit to which the first electrical signal or a signal related thereto is fed; a first noise filter; and an n stage (where n is an odd integer 3) filter network connected between the detector and the amplification circuit, the characteristics of the filter

network being such that the total thermal noise power output of the first noise filter is substantially minimised.

4,959,536

SHEET CONVEYING AND READING APPARATUS HAVING A LIGHT-INTERCEPTING MEMBER FOR REDUCING NOISE

Kazuya Ijuin, Tokyo; Shinnichiro Otsuki, Yokohama; Yuji Nakano, Yokosuka, and Hiroshi Ogushi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

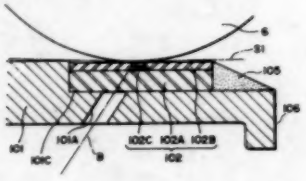
Continuation of Ser. No. 212,656, Jun. 28, 1988, abandoned.

This application Feb. 7, 1990, Ser. No. 477,112

Claims priority, application Japan, Jul. 6, 1987, 62-167053; Jul. 6, 1987, 62-167057

Int. Cl.[5] H01J *3/14*

U.S. Cl. 250—216 **30 Claims**



1. A sheet conveying and reading apparatus comprising:
a conveyance path for conveying sheets;
a transparent plate having a first surface at least a part of which is for contacting a surface of the sheets being conveyed on said conveyance path, and having a second surface opposed to said first surface;
a photoelectric conversion element abutting said second surface of said transparent plate, for reading an image on a conveyed sheet; and
a light-intercepting member for covering a side edge surface of said transparent plate to prevent light from entering said side edge surface.

4,959,537

METHOD AND APPARATUS FOR INSPECTING TRANSPARENT CONTAINERS

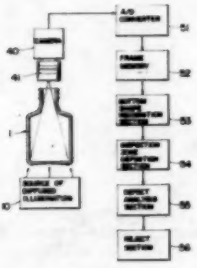
Tetsuya Kimoto, Yawata, and Masashi Nakagawa, Neyagawa, both of Japan, assignors to Matsushita Electric Works, Ltd., Japan

Filed Jun. 13, 1989, Ser. No. 365,934

Claims priority, application Japan, Jun. 16, 1988, 63-149000

Int. Cl.[5] G01N *21/90*

U.S. Cl. 250—223 B **20 Claims**



12. An apparatus for inspecting a transparent container having a defect on the container bottom comprising:
means for locating the container at an inspection station;
a source of diffused illumination for directing the diffused light through the bottom of the container located at said inspection station, said diffused illumination being greater in intensity at a peripheral region of the container bottom than at a central region of the container bottom;
light receiving means including a camera monitoring light energy transmitted through the container bottom and providing a distribution pattern of said monitored light energy along at least one dimension corresponding to a line extending in the plane of the container bottom;
means for obtaining from said light energy distribution pattern a pair of peak values spaced along said dimension and a corresponding pair of positions having said peak values, respectively;
calculator means for calculating a true center of the container bottom based upon thus obtained positions and defining based upon said true center an inspection zone in an exact coincidence with the container bottom;
detector means for analyzing said light energy transmitted through the container bottom within the confines of said inspection zone to detect a defect
on the container bottom; and
reject means for rejecting a container having such detected defect.

4,959,538

INSPECTION DEVICE

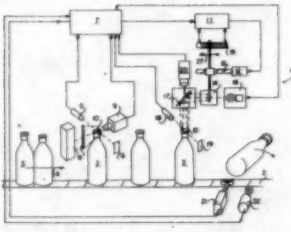
Nicolaas C. Swart, Deventer, Netherlands, assignor to Heuft-Qualiplus B.V., Netherlands

Filed Mar. 24, 1989, Ser. No. 328,297

Claims priority, application Netherlands, Apr. 5, 1988, 8800866

Int. Cl.[5] G01N *9/04*

U.S. Cl. 250—223 B **15 Claims**



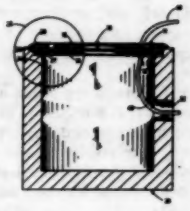
1. Device for inspecting the upper surfaces of successive objects, for instance the mouth edges of glass bottled carried by a conveyor belt and guided past the device thereby, which device is provided with an optical system, comprising:
a lighting system with a light source for lighting an upper surface of each successive object,
an optical imaging system for forming an image of an upper surface of each successive object,
measuring means for measuring the height of the upper surface of each successive object, and
adjustment means for setting the optical system on the basis of the height of the upper surface of each successive object as determined by said measuring means.

4,959,539

FLEXURAL DISK FIBER OPTIC HYDROPHONE

Thomas J. Hofler, Monterey, and Steven L. Garrett, Pebble Beach, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 20, 1989, Ser. No. 326,819
Int. Cl.[5] G01D 5/34; H01J 5/16; G01B 9/02
U.S. Cl. 250—227.19 12 Claims



1. A sensor for acoustic vibrations in a fluid, the sensor comprising:

an elastic element having opposite sides;

body means for peripherally supporting said element in contact with the fluid so that said vibrations induce deflections of said element corresponding to the vibrations; and

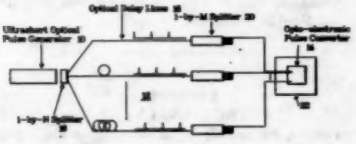
an optical fiber fixedly connected to one side of said element and wound thereon in a spiral so that said deflections induce in the fiber variations in length corresponding to said vibrations for interferometric measurements of said variations in length.

4,959,540

OPTICAL CLOCK SYSTEM WITH OPTICAL TIME DELAY MEANS

Bunsen Fan, Peekskill; Modest M. Oprysko, Mahopac, and Ricky A. Rand, Somers, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 15, 1989, Ser. No. 351,686
Int. Cl.[5] H01J 5/16; G02B 6/26
U.S. Cl. 250—227.12 19 Claims



1. An optical clock distribution system comprising:

optical pulse timing generator means for generating optical pulses having a predetermined repetition rate and duration,

a passive optical time delay line network composed of a plurality of optical time delay means coupled to said optical timing generator means for propagating optical pulses with different transient times, and

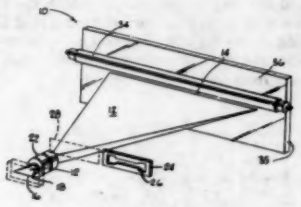
a plurality of opto-electronic toggle means at different locations remote from said pulse timing generator means, each of said toggle means being coupled to a pair of optical time delay means for combining delayed optical timing signals to generate electrical clock signals with minimum skew at each of said different locations.

4,959,541

METHOD FOR DETERMINING APERTURE SHAPE

David W. Boyd, Greeley, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Aug. 3, 1989, Ser. No. 389,033
Int. Cl.[5] H04N 1/10
U.S. Cl. 250—237 R 10 Claims



1. A method for selecting the shape of an occluding aperture which is to be positioned at a predetermined aperture location in a light path extending between an illuminated line object and a linear photosensor array whereby, through use of the aperture, a light intensity measurement is obtained across the linear photosensor array which is uniformly proportional to the light intensity across the illuminated line object, comprising the steps of:

(a) providing a constant light intensity across the illuminated line object during a testing period;

(b) measuring the light intensity across the linear photosensor array during the testing period without an occluding aperture in the light path;

(c) selecting a target, constant value light intensity which is to be achieved through use of occluding aperture;

(d) selecting an initial aperture shape and representing the selected shape mathematically;

(e) constructing a mathematical model for the light intensity at any point across the linear photosensor array, with an aperture of the selected shape in place at the predetermined aperture location;

(f) using the light intensity measured across the photosensor array during the testing period and the mathematical model to compute the light intensity across the photosensor array with an aperture of the selected shape in place;

(g) during a selected number of iterations, adjusting the mathematical expression representative of aperture shape in an orderly fashion adapted to minimize the total deviation of the computed light intensity across the linear photosensor array from the target constant value light intensity;

(h) selecting a final design aperture shape in accordance with the one of the adjusted mathematical expressions for aperture shape which produces the least total deviation in computed light intensity from the target constant value light intensity.

4,959,542

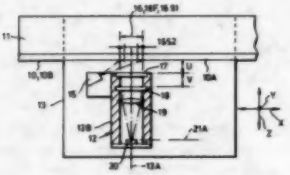
OPTO-ELECTRONIC SCALE-READING APPARATUS

William F. N. Stephens, Hawkesbury Upton, United Kingdom, assignor to Renishaw Plc, Gloucestershire, United Kingdom

PCT No. PCT/GB85/00600, § 371 Date Aug. 19, 1986, § 102(e) Date Aug. 19, 1986, PCT Pub. No. WO86/03833, PCT Pub. Date Jul. 3, 1986
PCT Filed Dec. 23, 1985, Ser. No. 368,075
Claims priority, application United Kingdom, Dec. 22, 1984, 8432574
Int. Cl.[5] H01J 3/14
U.S. Cl. 250—237 G 25 Claims

1. Apparatus for measuring displacement between two members, comprising:

(a) a scale on one of the members having marks defined by a light pattern;
(b) a read head provided on the other member;
(c) periodic diffraction means provided in the read head for interacting with said light pattern to produce interference fringes having movement relative to said read head responsive to a said displacement;
(d) there being a nominal periodicity determined by the read head, and defining the periodicity which the scale must have to satisfy optical parameters of said read head; and
(e) detecting means for detecting said movement, wherein
(f) said scale marks have secondary periodicities offset by departures from said nominal periodicity;



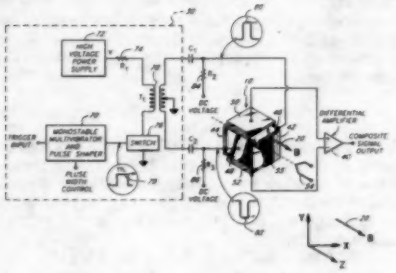
(g) means are provided defining the length of an effective sampling region of the scale, only light from said effective sampling region contributing to the production of said interference fringes;
(h) the diffraction means and said means for defining the length of an effective sampling region constitute a spatial filter passing said nominal periodicity; and
(i) said filter has a passband determined by the length of said effective sampling region and defining a maximum value of said departure, whereby secondary periodicities below said maximum departure contribute to production of said fringes, while secondary periodicities above said maximum departure do not contribute to production of said fringes.

4,959,543

METHOD AND APPARATUS FOR ACCELERATION AND DETECTION OF IONS IN AN ION CYCLOTRON RESONANCE CELL

Robert T. McIver, Jr., and Richard L. Hunter, both of Irvine, Calif., assignors to Ionspec Corporation, Irvine and Knobbe, Martens, Olson & Bear, Newport Beach, both of, Calif.

Filed Jun. 3, 1988, Ser. No. 202,209
Int. Cl.[5] H01J 49/38
U.S. Cl. 250—291 **29 Claims**



1. A Fourier transform mass spectrometer comprising:
an analyzer cell for receiving ions of a sample to be analyzed, said cell including a plurality of electrode plates and said cell mounted in an evacuable chamber;
an ionizer for forming ions of said sample;
a magnet for creating a undirectional magnetic field, said magnetic field orientated so that it passes through said analyzer cell in a predetermined direction;
a voltage source for producing voltages of magnitudes and polarities which are adequate to trap substantially all of said sample ions of a given charge sign contained within said cell when said voltages are applied to said plurality of electrode plates of said analyzer cell, said voltages further defining an electric potential at the approximate center of and within said cell, said unidirectional magnetic field causing said trapped ions to more orbitally at angular frequencies dependent on the mass-to-charge ratio of individual ions;
a signal generator for producing a first acceleration pulse having a first polarity with respect to said electric potential within said cell and a second acceleration pulse having a second polarity with respect to said electric potential such that when said first pulse is applied to a first one of said electrode plates and said second pulse is applied to a second one of said electrode plates, the combined effect of said first and second pulses is capable of simultaneously exciting said trapped ions orbiting at said angular frequencies, said individual orbiting ions producing signals equal to their respective angular frequencies which combine to form a broadband composite transient signal, at least one of said acceleration pulses having an acceleration period which is less than a period of a maximum frequency of said angular frequencies, said acceleration pulses producing an electric field which is substantially perpendicular to said unidirectional magnetic field, said acceleration pulses simultaneously accelerating substantially all ions trapped within said cell;
a broadband detector for simultaneously detecting said broadband composite transient signal which comprises the individual angular frequencies of a plurality of said individual ions contained in said cell and generating a time domain analog signal which contains information related to the magnitude and nature of the plurality of individual ions in the cell;
a Fourier analyzer for receiving said analog time domain signal and transforming said time domain signal into a frequency domain signal which contains information about the numerical magnitude, frequency and phase of accelerated ions of each different mass-to-charge ratio trapped in said analyzer cell; and
a sequencer for coordinating and controlling said ionizer, said voltage source, said acceleration pulses, said detector and said Fourier analyzer.

4,959,544

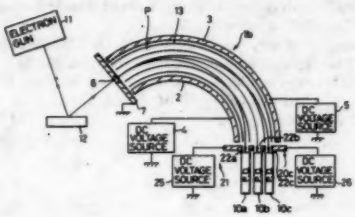
ENERGY ANALYZER

Satoru Sukenobu, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Oct. 3, 1989, Ser. No. 416,455
Claims priority, application Japan, Oct. 7, 1988, 63-252976
Int. Cl.[5] H01J 49/48
U.S. Cl. 250—305 **10 Claims**

1. An energy analyzer, comprising:
a pair of electrodes for forming an electrostatic field for deflection;
entrance and exit aperture plates having an aperture, arranged in entrance and exit portions of the electrostatic field;
a particle detector arranged in front of the aperture of the exit aperture plate for detecting a particle passing through the electrostatic field and the apertures of the entrance and exit aperture plates to analyze energy of the particle; and

means connected to the sides of at least the exit aperture plate for controlling a voltage distribution of a surface of



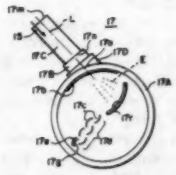
at least the exit aperture plate to approximately equal to a voltage distribution of the electrostatic field.

4,959,545

RADIATION IMAGE READ-OUT APPARATUS

Satoshi Arakawa, and Kenji Takahashi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Feb. 17, 1989, Ser. No. 312,099
Claims priority, application Japan, Feb. 19, 1988, 63-37002
Int. Cl.[5] G01N *23/04*
U.S. Cl. 250—327.2 **2 Claims**



1. A radiation image read-out apparatus comprising:

(i) a main scanning means for scanning a stimulable phosphor sheet, on which a radiation image has been stored, with stimulating rays in a main scanning direction, or along a main scanning line, thereby causing the stimulable phosphor sheet to emit light in proportion to the amount of energy stored during exposure to radiation,

(ii) a sub-scanning means for moving the stimulable phosphor sheet with respect to the stimulating rays in a sub-scanning direction approximately normal to the main scanning direction, and

(iii) a photo detecting means provided with an elongated photomultiplier having a light receiving face, which extends along the main scanning line on the stimulable phosphor sheet, for detecting the light emitted by the stimulable phosphor sheet, wherein the improvement comprises:

(a) said elongated photomultiplier being provided with a cylindrical main body, a photocathode being provided on an inner surface of said main body, and a light guide member being provided on said light receiving face so as to extend along said light receiving face and projection outward therefrom, said light guide member guiding said light emitted by said stimulable phosphor sheet toward said main body and radiating said light toward said photocathode, and

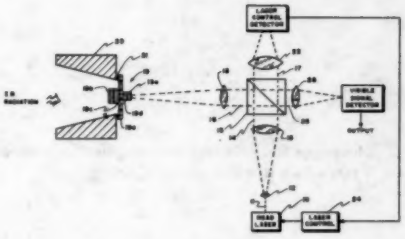
(b) said light guide member being inclined with respect to said cylindrical main body and said photocathode so that a line, passing through a point at the center of an inner edge face of said light guide member and a point at the center of an outer edge face (light input face) of said light guide member, forms an acute angle at its intersection with said photocathode.

4,959,546

THERMO-OPTICAL FAR INFRARED SYSTEM

Vincent T. Bly, Alexandria, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington

Filed Jun. 5, 1981, Ser. No. 282,615
Int. Cl.[5] G02F *1/01*; H01L *31/00*
U.S. Cl. 250—330 **1 Claim**



1. A thermo-optical far infrared system including:

a thermo-optical detector;

means for directing infrared radiation onto one side of said detector;

means for directing a read laser beam onto the other side of said detector; and

means for detecting the laser beam reflected from said detector, wherein said detector includes:

an infrared absorbing layer;

a reflective layer with one side essentially in thermal contact with said absorbing layer; and

a layer of material essentially in thermal contact with said reflective layer and having a temperature-dependent index of refraction, and whereby the infrared radiation on the detector induces a temperature rise and a consequent change in index of refraction therein, and thereby said read beam is reflected in accordance with said index of refraction.

4,959,547

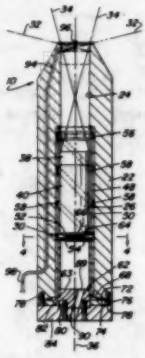
APPARATUS AND METHODS FOR DETECTING, LOCALIZING, AND IMAGING OF RADIATION IN BIOLOGICAL SYSTEMS

Robert G. Carroll, Largo, Fla., and Robin A. Wise, Jr., Morgan Hill, Calif., assignors to Care Wise Medical Products Corporation, Morgan Hill, Calif.

Filed Jun. 8, 1989, Ser. No. 363,243
Int. Cl.[5] G01T *1/161*
U.S. Cl. 250—336.1 **45 Claims**

1. A well shielded collimating probe for detecting radiation emanating from a hidden source, said probe comprising a small probe body formed of a radiation blocking material and arranged to be held adjacent said hidden source, radiation detecting means located within said probe body, window means covering aperture means confronting said detecting means through which radiation may pass, and adjustment means for adjusting the solid angle which radiation may pass through said aperture means to said detecting means, said solid angle

being continuously variable between a predetermined maximum angle and a predetermined minimum angle and vice



versa, whereupon the only radiation reaching said detecting means is that which is within said solid angle.

4,959,548

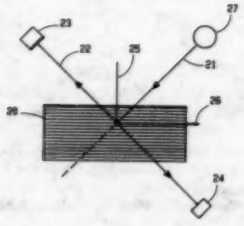
NEUTRON APPARATUS FOR MEASURING STRAIN IN COMPOSITES

David S. Kupperman, Oak Park; Saurindranath Majumdar, Naperville; John F. Faber, Jr., Downers Grove, and J. P. Singh, Bolingbrook, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed May 2, 1989, Ser. No. 346,762

Int. Cl.[5] G01N *23/207*

U.S. Cl. 250—390.09 **12 Claims**



1. A method for real-time simultaneous measurement of strain in the constituents of a composite comprising:

directing a polychromatic beam of neutrons from a pulsed source toward a sample,

orienting a multi-angle diffractometer so that two opposite detectors are on a line perpendicular to said neutron beam,

measuring, using Bragg's law, the strain on a vector bisecting the angle between said neutron beam and said line perpendicular to said neutron beam.

4,959,549

DETERMINATION OF PROPERTIES OF COAL

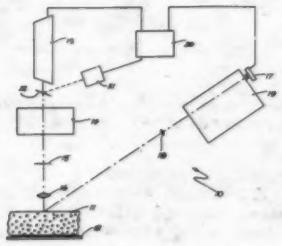
John G. Haub, Wentworthville; John E. Eberhardt, Sans Souci, and David L. Death, Bankstown, all of Australia, assignors to Commonwealth Scientific and Industrial Research Organisation, Campbell, Australia

Continuation of Ser. No. 126,914, Nov. 27, 1987, abandoned. This application Apr. 17, 1989, Ser. No. 339,926

Claims priority, application Australia, Nov. 28, 1986, PH9237

Int. Cl.[5] G01N *21/64, 21/63, 21/85*

U.S. Cl. 250—461.1 **41 Claims**



1. An apparatus for determining quantitatively a property of bulk coal from a fluorescence spectrum resulting from UV illumination of said coal, said apparatus comprising:

a UV light source for illuminating a plurality of surface macerals of bulk coal with UV light;

a fluorescent light detector positionable for detecting fluorescent light emitted by said macerals of said bulk coal in response to said illumination and for deriving output signals amplitude related to intensities of said detected fluorescent light as a function of wavelengths of said detected fluorescent light, and;

calculating means operatively associated with said detector for calculating quantitatively a property of said bulk coal from said output signals said calculating means comprising;

integration means integrating said output signals within a selected wavelength region for providing at least one integrated value; and

comparing means comparing said integrated value with at least one standard value derived from a calibration study of coal whereby to indicate quantitatively said property of said bulk coal from said comparison.

4,959,550

AUTOMATIC EXCHANGER OF AN ELECTRON BEAM IRRADIATOR FOR WINDOW FOIL

Masayuki Kashiwagi, and Takashi Matsumoto, both of Kyoto, Japan, assignors to Nissin High Voltage Co., Ltd., Kyoto, Japan

Filed May 17, 1988, Ser. No. 194,913

Claims priority, application Japan, May 18, 1987, 62-120372

Int. Cl.[5] H01J *33/04*

U.S. Cl. 250—492.3 **5 Claims**

1. A roller-type automatic foil exchanger for supplying a foil beneath a window formed in a flange at a surface of a vacuum container in an electron beam irradiator comprising:

a foil feed roller provided at one end of the flange and connected to one end of the foil, said feed roller for providing the foil;

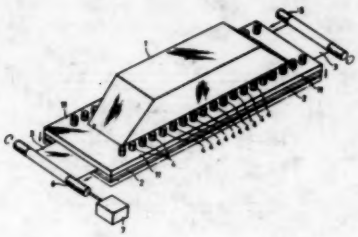
a foil take-up roller provided at the opposite end of the flange with respect to said foil feed roller and connected to the other end of the foil;

a foil holder for supporting the foil such that the foil is between the flange and the foil holder;

a winding motor for rotating said foil take-up roller to wind

the foil thereon and to cause foil to be unwound from said foil feed roller; and

a plurality of clamper members having portions extending through said flange and said foil holder, said clamper



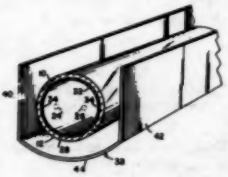
members being selectively actuatable to clamp said foil holder to the flange with the foil therebetween, said clamper members being disposed on either side of the foil along lines substantially parallel to the rolling direction of the foil.

4,959,551

COSMETIC TANNING LAMP AND SYSTEM HAVING ADJUSTABLE UVB PROPORTION

Steven C. Schlitt, Merrimac, Mass., assignor to GTE Products Corporation, Danvers, Mass.

Filed Feb. 27, 1989, Ser. No. 315,647
Int. Cl.[5] A61N 5/06; H01J 61/48
U.S. Cl. 250—504 R 3 Claims



1. A suntanning system comprising:

a fluorescent lamp including an ultraviolet-transmitting glass envelope of substantially circular configuration in cross-section, a first ultraviolet-emitting phosphor means having a predetermined proportion of UVB to UVA radiation disposed on a portion of the circumference of the interior surface of said envelope, a second ultraviolet-emitting phosphor means having a predetermined proportion of UVB to UVA disposed on the remaining portion of said circumference of said interior surface of said envelope, said predetermined proportion of UVB to UVA of said second ultraviolet-emitting phosphor means being greater than said predetermined proportion of UVB to UVA radiation of said first ultraviolet-emitting phosphor means, the proportion of UVB to UVA of the combined emission from said first and second ultraviolet-emitting phosphor means being controllable by the rotational alignment of said fluorescent lamp; and

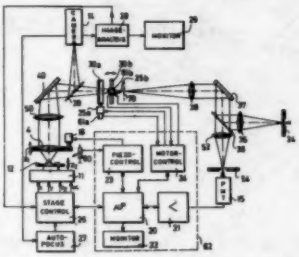
an external reflector means disposed adjacent said fluorescent lamp, said external reflecior means being effective in maintaining the irradiance level in the UVA region at approximately the same level independent of the rotational alignment of said fluorescent lamp.

4,959,552

MICROSCOPE ARRANGED FOR MEASURING MICROSCOPIC STRUCTURES

Ralf Saffert, Lauterstein, and Albert Schilling, Aalen, both of Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany

Filed Jan. 30, 1989, Ser. No. 303,923
Claims priority, application Fed. Rep. of Germany, Feb. 9, 1988, 3803854
Int. Cl.[5] G01N 21/86
U.S. Cl. 250—560 8 Claims



1. A microscope arranged for measuring microscopic structures by means of punctiform bundles of rays from a point source of light being focused by an optical system on a structure to be measured so that a photoelectric detector can receive the ray bundles reflected from said structure, said microscope comprising:

a. a plane plate arranged in a non-parallel ray portion of the path of said optical system, said plate being pivotally mounted for movement through a predetermined angle for moving the focal point of said ray bundles on said structure;

b. an encoder coupled with said plate for measuring the angle through which said plate is pivoted when moving said focal point; and

c. a processor, supplied with signals from said encoder corresponding to said angle measurement and with signals from said detector corresponding to the intensity of said reflected ray bundles, for calculating the linear dimensions of said structure over which said focal point has moved.

4,959,553

METHOD FOR MEASURING SHAPE AND APPARATUS THEREFOR

Seiki Yamada, Ibaraki, and Takashi Kawamura, Kobe, both of Japan, assignors to Sumitomo Rubber Industries, Ltd., Kobe, Japan

Filed Dec. 7, 1988, Ser. No. 280,798
Claims priority, application Japan, Dec. 9, 1987, 62-311707
Int. Cl.[5] G01N 21/86
U.S. Cl. 250—560 9 Claims

1. A method for measuring a shape comprising the steps of:

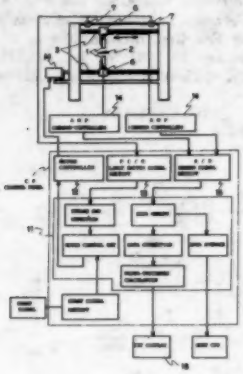
moving an article in a constant direction;

locating a pair of displacement sensors substantially opposing each other with the article therebetween;

scanning the article, having a cross sectional shape to be measured, along a direction of width of the article by moving said pair of displacement sensors laterally along a direction perpendicular to the direction of movement of the article;

detecting displacements of a surface on one side and detect-

ing displacements of a surface on another side of the article at every constant pitch; and



obtaining the cross sectional shape by processing the detected displacements.

4,959,554

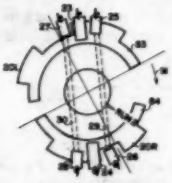
DUAL INPUT-DUAL OUTPUT ELECTRIC SWITCH

Joseph W. T. Underwood, IV, 4322 Tidewater Dr., Jacksonville, Fla. 32250, and Eugene F. Rockafeller, P.O. Box 817, Big Pine Key, Fla. 33043

Filed May 8, 1989, Ser. No. 348,908

Int. Cl.[5] H01I *19/58*; H02J *1/00*

U.S. Cl. 307—38 **11 Claims**



1. An electric vapor-proof, spark-proof, switch having two pair of current input terminals and of two current output terminals comprising a vapor-proof, electrically nonconductive housing enclosing a rotatable insulated disc having two current conductive plates attached thereto and insulated from each other each said pair of stationary current input terminals selectively engagable or disengagable with one said plate respectively of selected rotational positions of said disc; and the two said terminals of each said pair being electrically conductively connected to each other and insulated from the other said pair said two stationary said current output terminals each being continuously engagable with one of said plates respectively, an indicator outside of said housing to identify positions of said disc wherein selected input terminals are electrically connected to one of said output terminals, and a means outside of said housing for rotating said disc to any of said positions.

4,959,555

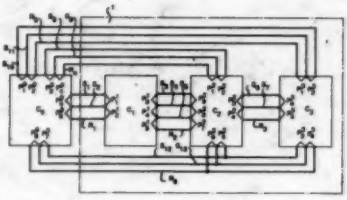
INTERCONNECTION MEDIUM

Douglas C. Schmidt, Summit, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 27, 1989, Ser. No. 345,274

Int. Cl.[5] H01J *19/82*; H03K *3/26*

U.S. Cl. 307—219 **4 Claims**



1. A circuit comprising:

an interconnection medium comprising a substrate and plurality of conductors over a major surface of said substrate, said conductors being formed in a manner which provides electrical interconnection between components mounted to said medium;

characterized in that said medium includes conductors between the same components which are in addition to the conductors needed to interconnect the components such that alternate conducting means are established between components in the event of a fault in one of the conductors needed to interconnect the components, and the conductors providing electrical interconnection between components are arranged in at least two sets with a first set of conductors coupled to a first set of components and a second set of conductors coupled to a second set of components, and there is further provided a shared conductor located between the two sets and which physically extends to both sets of conductors.

4,959,556

CIRCUIT ARRANGEMENT FOR DERIVING A DIRECT VOLTAGE FROM THE MAINS ALTERNATING VOLTAGE

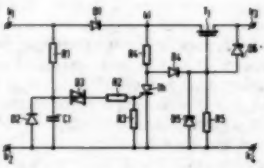
Jan H. Dekker, Hoogeveen, and Ate K. Damstra, Drachten, both of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Feb. 2, 1989, Ser. No. 306,192

Claims priority, application Netherlands, Feb. 5, 1988, 8800275

Int. Cl.[5] H03K *5/01, 17/72, 17/687*

U.S. Cl. 307—261 **17 Claims**



1. A circuit arrangement for deriving a direct voltage from an alternating voltage, said circuit arrangement comprising:

two input terminals,

two output terminals one of which is connected to one of the input terminals,

a switching transistor whose main current path is connected

between the other input terminal and the other output terminal,

a control circuit for controlling the switching transistor, which control circuit includes a thyristor which is connected via a first resistor between the two input terminals, a node between the first resistor and thyristor being connected to a control electrode of the switching transistor, and

a time-determining circuit comprising a series arrangement of a second resistor capacitor and a trigger element connected between a gate terminal of the thyristor and a node between said second resistor and capacitor, characterized in that the trigger element comprises a diac, in that the other input terminal is connected to an alternating voltage terminal via a rectifier diode arranged in the forward direction with the main current path of the switching transistor, in that the series arrangement of second resistor and capacitor is connected between the alternating voltage terminal and the one input terminal and in that a diode is coupled across the capacitor in such a way that said diode conducts during the periods when the rectifier diode is blocked.

4,959,557

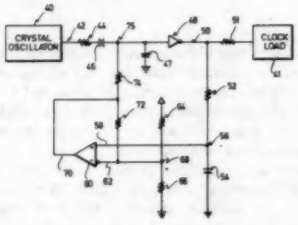
NEGATIVE FEEDBACK CIRCUIT TO CONTROL THE DUTY CYCLE OF A LOGIC SYSTEM CLOCK

Joseph P. Miller, Houston, Tex., assignor to Compaq Computer Corporation, Houston, Tex.

Filed May 18, 1989, Ser. No. 354,227

Int. Cl.[5] H03K *5/13*

U.S. Cl. 307—265 **10 Claims**



1. A device for dynamically regulating the duty cycle of an oscillating signal, comprising:

a high-level buffer having an input for receiving said oscillating signal and generating a buffered signal at an output;

a circuit receiving said buffered signal and generating a voltage signal corresponding to the duty cycle of said buffered signal;

a comparator receiving said voltage signal and a reference signal and producing a biasing signal for applying to said buffer input as negative feedback.

4,959,558

CIRCUIT ARRANGEMENT FOR DETECTING CROSS-OVER BY AN ALTERNATING VOLTAGE OF A FIXED REFERENCE VOLTAGE LEVEL

Malcolm J. Kay, Lockleys, and Philip A. Tracy, Epping, both of Australia, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 21, 1989, Ser. No. 326,575

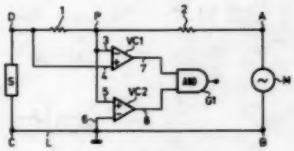
Claims priority, application Australia, Mar. 31, 1988, PI7555

Int. Cl.[5] H03K *5/153, 5/24, 17/13*

U.S. Cl. 307—354 **13 Claims**

1. A circuit arrangement for detecting the crossings by an applied alternating voltage of two separate threshold levels respectively above and below a fixed reference voltage level comprising:

a direct current source supplying a dc supply voltage of fixed magnitude relative to the reference voltage, an electrical path extending between the applied alternating voltage and the dc supply voltage which includes a series combination of two resistances, a first voltage comparator having two possible logic output states and connected to compare the voltage at a junction of the two resistances with the dc supply voltage so that the logic output state of the first voltage comparator at any instant is determined by the voltage at the junction relative to the dc supply voltage, a second voltage comparator having two possible logic output states and connected to compare the voltage at the junction of the two resistances with the reference voltage so that the logic output state of the second voltage



comparator at any instant is determined by the voltage at the junction relative to the reference voltage, and logic means in which the logic output state of the first comparator is combined logically with the logic output state of the second comparator to produce a pulse spanning each instant of cross-over by the applied alternating voltage of the fixed reference voltage, said pulse having a leading edge and a trailing edge which respectively correspond with the instants of crossing by the applied alternating voltage of the two separate threshold levels and whereby one threshold level is determined by the magnitude of the dc voltage and the other threshold level is determined by the ratio of the resistance values of the two resistances and the dc supply voltage.

4,959,559

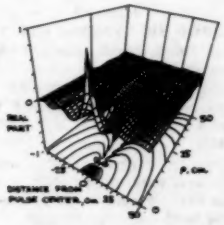
ELECTROMAGNETIC OR OTHER DIRECTED ENERGY PULSE LAUNCHER

Richard W. Ziolkowski, Livermore, Calif., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 31, 1989, Ser. No. 331,141

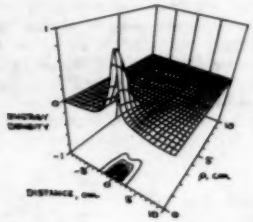
Int. Cl.[5] H01Q *3/26*; H04B *1/12*; H01S *3/23, 3/30*

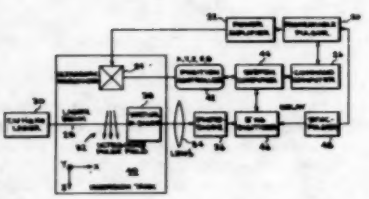
U.S. Cl. 307—425 **20 Claims**



1. A method of producing a localized packet of wave energy

which travels substantially large distances compared to the Rayleigh length without substantial divergence, comprising:





independently driving each element of a finite array of radiating elements with a drive function determined by

$$f(r,t) = \int_0^\infty \Phi_k(r,t)F(k)dk$$

where $\Phi_k(r,t)$ is a basis function which is an exact or approximate non-separable space-time solution of the relevant wave propagation equation and F(k) is a spectrum function which satisfies

$$\int_0^\infty dk\ |F(k)|^2 e^{2kz_0} E_1(2kz_0) <$$

$$\frac{1}{2z_0} \int_0^\infty dk\ |F(k)|^2 \frac{1}{k} < \infty.$$

4,959,560

ERROR PREVENTING CIRCUIT

Takayuki Ootani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 8, 1989, Ser. No. 320,741

Claims priority, application Japan, Mar. 8, 1988, 63-52524

Int. Cl.[5] H03K *17/16, 3/01, 19/094*

U.S. Cl. 307—443 **14 Claims**

1. A semiconductor integrated circuit including an input buffer operation error preventing circuit, comprising:

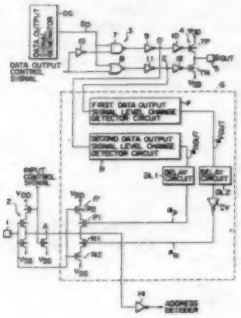
a data output signal generator for generating a first or a second logic level data output signal;

an output control circuit means, including first and second current paths for first and second current path signals having first or second logic levels, for receiving the logic level data output signal from the data output signal generator, for generating said first and second current path signals from the logic level data output signal and for generating an output control signal having a first or a second logic level from each current path signal;

an output buffer, connected across first and second potential supply means, for receiving the output control signals from the output control circuit means and for generating a first or a second voltage level output buffer signal in accordance with the logic levels of the output control signals;

an input buffer, connected across the first potential supply means and the second potential supply means, for receiving an input signal of a predetermined level;

data output signal level detector means for detecting at least one of a transition of the output buffer signal from said first voltage level to said second voltage level and a transition of the output buffer signal from said second voltage



level to said first voltage level by detecting at least one of a transition of one of said current path signals from the first logic level to the second logic level and a transition of one of said current path signals from the second logic level to the first logic level and for generating at least a first or a second detection signal; and

input buffer threshold level control means, responsive to the first or the second detection signals, for controlling the input buffer so as to cancel a fall in a level detection margin of the input signal of the input buffer caused by a potential variation of the first or second potential supply means resulting from a transition of the output buffer signal from the first voltage level to the second voltage level or from the second voltage level to the first voltage level.

4,959,561

MOS OUTPUT BUFFER WITH REDUCED SUPPLY LINE DISTURBANCE

Mark W. McDermott, and Ernest A. Carter, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 293,245, Jan. 4, 1989, abandoned. This application Mar. 26, 1990, Ser. No. 499,569

Int. Cl.[5] H03K *17/16, 19/017, 5/12*

U.S. Cl. 307—443 **9 Claims**

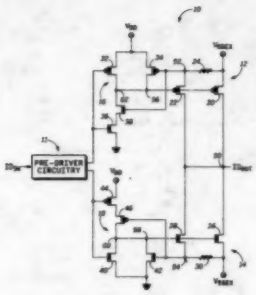
1. An output buffer circuit, comprising:

driver means, coupled to an output terminal and having an input, for supplying current between a first power supply terminal and said output terminal in proportion to a control voltage on said input;

sensing means, having an input, coupled to the input for said driver means, for receiving said control voltage, for detecting the current supplied between said output terminal and said first power supply terminal by said driver means, and proving a feedback voltage proportional thereto;

input means for providing the control voltage in response to a data signal;

control means, coupled to said driver means, said input means, and said sensing means, for receiving said feedback



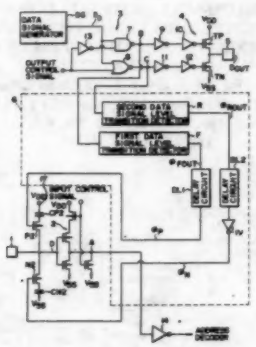
voltage, and for modulating said control voltage in response thereto.

4,959,562

ERROR PREVENTION CIRCUIT WITH CAPACITIVE MEANS

Takayuki Ootani, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 17, 1989, Ser. No. 325,186
Claims priority, application Japan, Mar. 18, 1988, 63-63462
Int. Cl.[5] H03K *17/16, 3/01, 19/094*
U.S. Cl. 307—443 **19 Claims**



1. A semiconductor integrated circuit including an input buffer operation error preventing circuit, comprising:

a data signal generator for generating a first or a second logic level data output signal;

an output control circuit means, including first and second current paths for first and second current path signals having first or second logic levels, for receiving the logic level data output signal from the data signal generator, for generating said first and second current path signals from the logic level data output signal and for generating an output control signal having a first or a second logic level from each current path signal;

an output buffer, connected across first and second potential supply means and, for receiving the output control signals from the output control circuit means and for generating a first or a second voltage level output buffer signal in accordance with the logic levels of the output control signals;

an input buffer, connected across the first potential supply means and the second potential supply means, for receiving an input signal of a predetermined level;

data output signal level transition detector means for detecting at least one of a transition of the output buffer signal from said first voltage level to said second voltage level and a transition of the output buffer signal from said second voltage level to said first voltage level by detecting at least one of a transition of one of said current path signals from the first logic level to the second logic level and a transition of one of said current path signals from the second logic level to the first logic level and for generating at least a first or a second detection signal; and

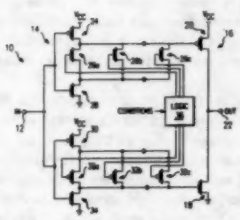
input buffer signal terminal control means, responsive to the first or the second detection signals, for controlling the input buffer so as to cancel a fall in the level detection margin of the input signal of the input buffer caused by a potential variation of the first or second potential supply means resulting from a transition of the output buffer signal from the first voltage level to the second voltage level or from the second voltage level to the first voltage level, said input buffer signal terminal control means including capacitive means for preventing steep potential variations in an output of the input buffer.

4,959,563

ADJUSTABLE LOW NOISE OUTPUT CIRCUIT

Stephen R. Schenck, McKinney, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 29, 1988, Ser. No. 213,060
Int. Cl.[5] H03K *19/017, 19/094, 19/173*
U.S. Cl. 307—448 **16 Claims**



1. Output circuitry to reduce inductive voltage spikes in an integrated circuit comprising:

an input node for receiving an input voltage signal;

an output transistor having first, second and control terminals;

voltage control circuitry responsive to the voltage at said input node for controlling the voltage of the control terminal of said output transistor with respect to time such that the change in output current between the first and second terminals with respect to time has a relatively constant magnitude and;

magnitude control circuitry connected to said voltage control circuitry for controlling the magnitude of constant change of output current with respect to time;

wherein said output transistor comprises an N channel output transistor and said voltage control circuitry comprises:

a first P channel transistor having its gate connected to said input node, a first terminal connected to a predetermined high voltage and a second terminal connected to a first node;

an N channel transistor having a gate connected to said input node, a first terminal connected to a predetermined low voltage and a second terminal connected to the gate of said output transistor; and

a plurality of P channel transistors each having gates selectively connected to a respective predetermined voltage and each having first and second terminals connected

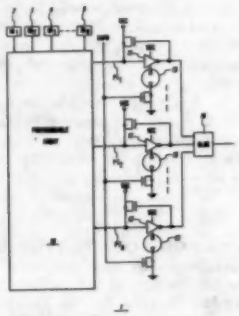
between the second terminal of said first P channel transistor and said N channel transistor.

4,959,564

SENSE AMPLIFIER POWER DOWN CIRCUITRY FOR PROGRAMMABLE LOGIC DEVICE

Randy C. Steele, Scottsdale, Ariz., assignor to SGS-Thomson Microelectronics, Inc., Carrollton, Tex.

Filed Jan. 6, 1989, Ser. No. 294,319
Int. Cl.[5] H03K *17/16, 19/094;* H02H *7/20*
U.S. Cl. 307—465 **4 Claims**



1. Sense amplifier circuitry for use in a programmable logic device, comprising:

a power supply having positive and ground terminals;

at least one sense amplifier input stage connected to said power supply and having an input terminal connected to a product term signal line of the programmable logic device;

a sense amplifier output stage connected to said power supply and said sense amplifier input stage at a common node, said output stage having an output signal terminal; and

a switch connected between one terminal of said power supply and said sense amplifier input stage and said sense amplifier output stage, wherein said switch has a control input, and wherein the application of a selected signal to the control input causes said switch to disconnect the sense amp from the one terminal of said power supply.

4,959,565

OUTPUT BUFFER WITH GROUND BOUNCE CONTROL

Mark W. Knecht, Campbell, and Scott O. Frake, Santa Clara, both of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Feb. 10, 1989, Ser. No. 309,253
Int. Cl.[5] H03K *3/13, 5/13, 17/28, 17/687*
U.S. Cl. 307—542 **28 Claims**

1. An output circuit comprising:

a first supply terminal for receiving a first supply voltage;

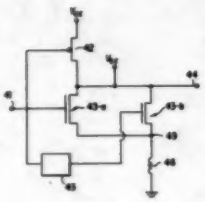
an input terminal for receiving an input signal;

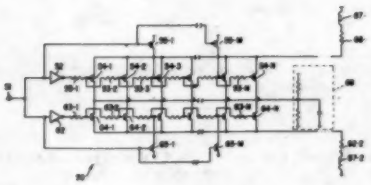
an output terminal for providing an output signal as a result of said input signal;

a first plurality of transistors, each having a first current carrying lead coupled to said first supply terminal, a second current carrying lead coupled to said output terminal, and a control lead having a capacitance associated therewith; and

a plurality of polycrystalline silicon resistors coupled in series between said control leads of adjacent ones of said plurality of transistors, one of said plurality of resistors also being coupled to said input terminal said polycrystalline silicon having a sheet resistance within the range of approximately 10 to 40 ohms/square,

wherein said plurality of resistors and said capacitances form a distributed RC network which causes said first plurality





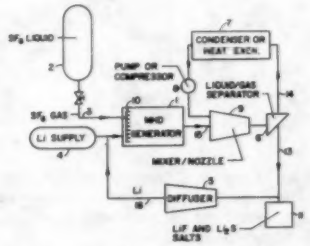
of transistors to turn on in sequence in response to said control signal.

4,959,566

LITHIUM-SULFUR HEXAFLUORIDE MAGNETOHYDRODYNAMIC POWER SYSTEM CONFIGURATIONS AND SYSTEM DESIGN CONSIDERATIONS

Flavio Dobran, 21st & Broadway, Long Island City, N.Y. 11106, assignor to Flavio Dobran, Long Island City, N.Y.

Filed Apr. 14, 1989, Ser. No. 338,103
Int. Cl.[5] H02K *44/08*
U.S. Cl. 310—11 **5 Claims**



1. A magnetohydrodynamic power generation system using lithium and sulfur-hexafluoride whereby lithium supplied from a lithium supply tank and sulfur hexafluoride supplied from a storage tank are mixed and reacted in the magnetohydrodynamic channel and mixed with a transporting fluid downstream of the channel in a mixer/nozzle, or whereby the liquid lithium exiting from the magnetohydrodynamic channel is mixed and reacted with the sulfur hexafluoride gas and transporting fluid in a mixer/combustor/nozzle unit downstream of the channel and consequently separated into lithium and transporting fluid streams, such that after being cleaned from the products of combustion the unreacted lithium is returned to the generator channel inlet, whereas the transporting fluid is re-

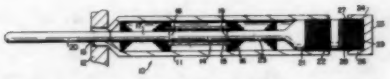
turned to the mixer/nozzle or mixer/combustor/nozzle unit in a closed cycle or rejected in an open cycle system.

4,959,567

MAGNETODISTORTIVE ACTUATOR WITH ADJUSTABLE MAGNETIC BIAS

Mark A. Ealey, Ayer, Mass., and Robert L. Lillard, Jupiter, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 20, 1988, Ser. No. 286,837
Int. Cl.[5] G02B *7/18*
U.S. Cl. 310—26 **11 Claims**



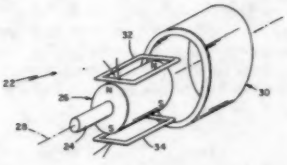
1. A magnetodistortive actuator comprising a support;
an elongated active component of a magnetodistortive material mounted on said support and having a stationary and a movable end portion;
electromagnetic means for subjecting said active component to a variable magnetic field to selectively shorten and lengthen said active component with attendant movement of said movable end portion relative to said support, including a solenoid coil mounted on said support and surrounding said active component and means for supplying electric power to said solenoid coil to energize the same; and
adjustable permanent magnet means separate from said electromagnetic means for applying a permanent magnetic bias to said active component to bring the latter to a desired point of a stress/field characteristic line independently of the action of said electromagnetic means on said active component, including at least one permanent magnet and means for selectively varying the strength of that portion of the magnetic field of said permanent magnet that acts on said active component even in the absence of energization of said solenoid coil.

4,959,568

DYNAMICALLY TUNABLE RESONANT DEVICE WITH ELECTRIC CONTROL

Brian P. Stokes, Arlington, Mass., assignor to General Scanning, Inc., Watertown, Mass.

Filed Aug. 5, 1986, Ser. No. 893,481
Int. Cl.[5] G02B *26/10*; H02K *33/00*
U.S. Cl. 310—51 **19 Claims**



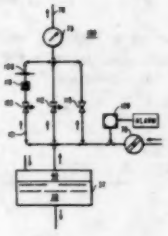
1. Apparatus comprising an element mounted to rotate in oscillation about an axis, said element having a resonant frequency of rotation and being rotatable resonantly, and
means for dynamically tuning said resonant frequency to a desired frequency, said means including two magnetic components which cooperate via their respective magnetic fields to form a resultant magnetic field for controlling the resonant frequency of said rotatable element, one said component being mounted for rotational motion with said element, the other said component having a fixed mounting, said components being arranged to apply said resultant field to said element to magnetically tune said resonant frequency.

4,959,569

STATOR COIL WATER SYSTEM EARLY ALERT HYDROGEN LEAKAGE MONITOR

Owen R. Snuttjer, Oviedo, and Michael J. Rasinski, Winter Springs, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 22, 1989, Ser. No. 441,135
Int. Cl.[5] H02K *9/00, 9/24*; G01M *3/08*; F28F *00/00*
U.S. Cl. 310—53 **22 Claims**



19. A dynamo-electric machine comprising:
a stator having a winding therein, the winding having coolant holes therethrough;
a rotor centrally disposed within the stator;
a gas-tight housing enclosing the stator and rotor;
a gas cooling system for circulating a coolant gas within the housing, the gas coolant being maintained at a first predetermined pressure;
a liquid cooling system for circulating a liquid coolant through said coolant holes of the winding, the liquid coolant system including a holding tank for collecting the liquid coolant therein, an inlet piping system for transporting the liquid coolant from the holding tank to the winding, an outlet piping system for removing the liquid coolant from the winding to the holding tank, pressuring system for pressuring the liquid system by introduction of a second gas into the holding tank at a first predetermined level, the liquid coolant thereby being maintained at a pressure which is less than that of the gas cooling system, and a leakage monitor for detecting leakage of said gas coolant into said liquid cooling system, said gas leakage detection monitor further comprising:
a. a first pressure relief valve in fluid communication with the holding tank and set at a second predetermined level which is greater than the first;
b. an orifice in fluid communication with the first pressure relief valve on an end opposite that of the holding tank, said orifice having an opening therein sized so as to release a specified volume of gas from the holding tank when the pressure therein is at least as great as the second predetermined level;
c. a second pressure relief valve in fluid communication with the holding tank and set at a third predetermined level greater than the second predetermined level;
d. a pressure switch in fluid communication with the holding tank and set at a fourth predetermined level, the fourth predetermined level being greater than the second but less than the third predetermined levels, such that said pressure switch is activated when the pressure within the holding tank is at least as great as the fourth predetermined level;
e. alarm indicating means operably connected to said

pressure switch so as to produce an alarm signal when said pressure switch is activated;

f. a bypass valve in fluid communication with the holding tank so as to vent large volumes of gas from the tank when the bypass valve is opened; and

g. a gas meter in fluid communication with each of said first and second pressure relief valves and the bypass valve so as to give an indication of the volume of gas that is vented from the holding tank.

4,959,570

MOTOR COOLING SYSTEM

Kosei Nakamura, Hino, and Yoshiyuki Hayashi, Yamanashi, both of Japan, assignors to Fanuc Ltd., Yamanashi, Japan

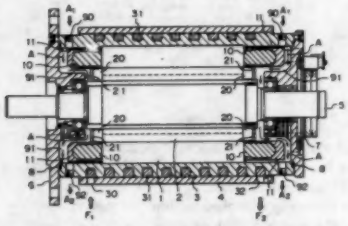
PCT No. PCT/JP88/00690, § 371 Date Mar. 7, 1989, § 102(e) Date Mar. 7, 1989, PCT Pub. No. WO89/00784, PCT Pub. Date Jan. 26, 1989

PCT Filed Jul. 9, 1988, Ser. No. 353,621

Claims priority, application Japan, Jul. 9, 1987, 62-169680

Int. Cl.[5] H02K *9/00*

U.S. Cl. 310—54 **4 Claims**



1. A motor cooling system comprising:

a coating layer coating projecting portions of stator coils of a stator of the motor;

a cooling liquid cooling said projecting portions of said stator coils and cooling opposite ends of a rotor of said motor;

an oil jacket surrounding said stator of the motor, said oil jacket having inlet and outlet openings formed on opposite sides of the oil jacket; and

flow passages extending from the inlet opening, extending past the coating layer coating the projecting portions of the stator coils, extending past outer surfaces of end rings of the rotor and extending to the outlet openings of the oil jacket, wherein the cooling liquid flows through the flow passages.

4,959,571

AXIAL-FLOW FAN WITH TAPERED HUB AND DUCT

Kazuhiro Yasumoto, and Ippei Hagiwara, both of Nakatsugawa, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 9, 1989, Ser. No. 321,007

Claims priority, application Japan, Mar. 11, 1988, 63-57462

Int. Cl.[5] H02K *9/06*; F04D *29/52*

U.S. Cl. 310—67 R **15 Claims**

1. An axial-flow fan comprising:

a motor having a drive shaft;

a motor support for supporting the motor;

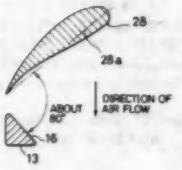
a frame having a generally cylindrical inner surface;

legs each having one end connected to the frame and the other end connected to the motor support for supporting the motor support;

a boss fixed to the drive shaft and having a generally cylindrical outer surface; and

blades radially extending from the cylindrical outer surface of the boss;

said boss and blades being driven by said motor to cause an air stream along an axis of the motor;



wherein said legs each have three generally flat sides, one of said sides being inclined with respect to the direction of the incoming air stream.

4,959,572

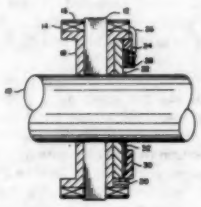
ROTATING RECTIFIER ASSEMBLY

Richard J. Becker, Brick, N.J., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed Jun. 26, 1989, Ser. No. 371,362

Int. Cl.[5] H02K *15/14*; B32B *15/08*

U.S. Cl. 310—68 D **27 Claims**



1. A rotating rectifier assembly in a generator for rectifying an ac signal generated by windings in an exciter rotor disposed about a rotatable shaft for rotation therewith, comprising:

a substrate disposed about the shaft for rotation therewith;

rectifying means secured to said substrate for rectifying the ac signal;

ac conductor means having a first end connected to the windings and a second end for supplying the ac signal to the rectifying means;

a conductive bus bar secured to said second end of said ac conductor means and to said rectifying means;

a ring disposed about the shaft and secured to said substrate such that said bus bar curls around said ring, whereby said ring opposes centrifugal forces exerted on said bus bar during rotation of the shaft; and

conductor means secured to said substrate on which a dc signal is provided upon rotation of the shaft and the rotating rectifier assembly.

4,959,573

ELECTROMAGNETIC INDUCTION MACHINES HAVING REGULATED POLAR MAGNETIC SYMMETRY

Gary D. Roberts, Lindon, Utah, assignor to S.P.C. Holding, Co., Ltd., Salt Lake City, Utah

Continuation of Ser. No. 83,137, Aug. 12, 1987, Pat. No. 4,808,868, which is a continuation of Ser. No. 900,700, Aug. 27, 1986, abandoned. This application Feb. 27, 1989, Ser. No. 315,800

Int. Cl.[5] H02K *11/00*; H02P *1/44*

U.S. Cl. 310—68 R **9 Claims**

1. A reversible dynamoelectric machine adapted to be sup-

plied with three-phase power at three-power phase input terminals, said machine comprising:

a rotatable rotor carrying a plurality of interconnected rotor windings;

a stationary stator operatively associated with said rotor;

a first stator winding in parallel with a first capacitor;

a second stator winding in parallel with a second capacitor;

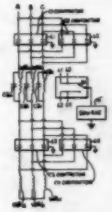
a third stator winding in parallel with a third capacitor;

a fourth stator winding;

a fifth stator winding;

a sixth stator winding, each of said first through sixth windings having two ends, one end of each of said fourth, fifth and sixth stator windings being electrically connected together; and

relay switching means operative in first and second positions, said relay switching means operative in said first position for connecting one end of said first stator winding



to a first of said three power phase input terminals, connecting one end of said second stator winding to a second of said three power phase input terminals, connecting one end of said third stator winding to a third of said three power phase input terminals, connecting the other end of said fourth stator winding to the other end of said first stator winding, connecting the other end of said fifth stator winding to the other end of said second stator winding, and connecting the other end of said sixth stator winding to the other end of said third stator winding, and operative in said second position for changing the connection of the one ends of two of said first, second and third stator windings to different of said first, second and third input terminals, and connecting the other ends of two of said fourth, fifth and sixth stator windings to different of the other ends of said first, second and third stator windings.

4,959,574

PRECISION GAP MAGNETIC ENCODE DEVICE

Hidemasa Suzaki; Ichiro Tokunaga, both of Furukawa; Hiraku Abe, Miyagi, and Yasuaki Ogawa, Furukawa, all of Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Mar. 31, 1989, Ser. No. 332,640

Claims priority, application Japan, May 28, 1988, 63-129461

Int. Cl.[5] H02K *15/00, 5/26*

U.S. Cl. 310—91 **10 Claims**

1. A magnetic encoder device, comprising:

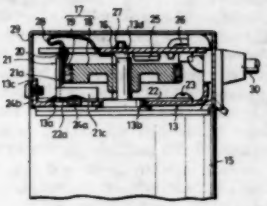
a magnetic scale having thereon a magnetic code which can be detected by a magnetic sensor;

a sensor retaining member for securely retaining said magnetic sensor with a gap between said magnetic scale and said magnetic sensor to allow relative rotation between said magnetic scale and said magnetic sensor;

a housing member to which said sensor retaining member is secured;

first bonding agent for securing said housing member and a first portion of said sensor retaining member adjacent said housing member to each other; and

a second bonding agent for securing said housing member and a second portion of said sensor retaining member



which is remote from said first portion, said second bonding agent being softer than said first bonding agent.

4,959,575

TRANSPOSITIONED MULTI-STRAND CONDUCTOR FOR ELECTRIC ROTARY MACHINE

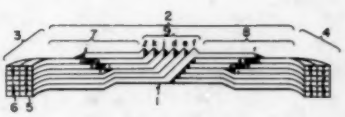
Toshio Saitoh; Noriyoshi Takahashi, and Masaki Satoh, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 571,945, Jan. 19, 1984, abandoned. This application Jul. 10, 1989, Ser. No. 377,762

Claims priority, application Japan, Jan. 28, 1983, 58-11447

Int. Cl.[5] H02K *3/14*

U.S. Cl. 310—213 **2 Claims**



1. A transposed multi-strand bar for a rotary electric machine, the transposed multi-strand bar being adapted to be received in a slot of a stator core of a rotary electric machine, the transposed multi-strand bar comprising:

a centrally disposed slanted strand portion;

a slot-inside end portion disposed on a first side of said centrally disposed slanted strand portion and on a second side thereof;

slot-outside end portions leading out of opposite slot-inside end portions of said stator core;

at least two adjacent groups of strands, each group of strands including a plurality of stacked strands divided into a first half and second half of strands transposed in such a manner that the respective stands have different stacked portions in the respective slot-inside end portions and the centrally disposed slanted strand portion, each of said groups of strands being shorted at each end thereof, wherein the transposition of the respective strands of the first half of strands is effected in such a manner that strands disposed at an uppermost position of the first half of strands of the respective groups of strands are transposed in the slot-inside end portion on the first side of the centrally disposed slanted portion to longitudinally gradually descend through the centrally disposed slanted portion from the uppermost position to a lowermost position in the slot-inside end portion on the second side of the centrally disposed slanted portion and strands disposed in a lowermost position of the second half of strands longitudinally gradually ascend through the slot-inside end portion on the first side of the centrally disposed slanted portion so as to reach the uppermost position in the slot-inside end portion on the second side of the centrally disposed slanted portion and are transposed thereat, and

wherein strands arranged between the uppermost and lowermost position of the respective groups of strands are transposed at a position in a vicinity of an intersecting point with the strand which is descending from the uppermost position and the strand which is ascending from the lowermost position while following the descent and ascent of the respective descending and ascending strands from the uppermost and lowermost positions, whereby adjacent strands of the first half of strands are transposed to opposite strand stacks to each other in said slot-inside end portion on the first side of the centrally disposed slanted strand portion and adjacent strands of the second half of strands respectively located are transposed to opposite strand stacks in the slot-inside end portion on the second side of the centrally disposed slanted portion so that no circulating current flows between adjacent strands in the respective slot-inside end portions even if a magnetic flux is inputted in either a vertical or horizontal direction to the multi-strand bar.

4,959,576

AUTOMOTIVE ALTERNATOR

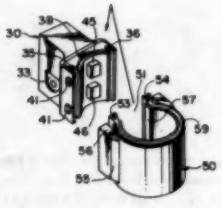
Mitsutoshi Horibe, Anjo; Hiroshi Hamada, Kariya, and Hiroshi Sakakibara, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Nov. 22, 1988, Ser. No. 274,856

Claims priority, application Japan, Nov. 25, 1987, 62-296894; Apr. 26, 1988, 63-103408

Int. Cl.[5] H02K *13/00*

U.S. Cl. 310—239 **9 Claims**



1. An automotive alternator comprising:

a rotor around which a rotor coil is wound, said rotor having a rotary shaft adapted to be coupled to and driven by an automotive engine;

a frame for encasing said rotor in a way such that a portion thereof extends out of said frame;

slip rings provided at one end portion of said portion of said rotary shaft extending outside of the frame, said slip rings being electrically connected to said rotor coil;

a plurality of brushes that are in sliding contact with said slip rings;

a brush holder, having receiving portions for encasing said brushes and having a pair of first members which are one of recess portions and projection portions, formed on both sides of said receiving portions, respectively, and extending in an axial direction of said rotary shaft;

a cover body disposed around an outer periphery of said slip rings, said cover body including a cylindrical portion having in a side wall thereof an opening through which said brushes extend and having an axial length which is similar to an axial length of said brush holder, said cylindrical portion having second members which are one of recess portions and projection portions that are sealingly engageable with said one of the recess portions and projection portions of said brush holder;

one of said first and second members being said recess portions and the other being said projection portions, wherein each said recess portion has a rectangular cross-section with an open end and two edge corners spaced from said open end, wherein an end thereof into two parts, which respectively connect to said two edge corners;

a rear cover for encasing said brush holder and said cover body;

seal members interposed between said frame and said brush holder and cover body, and between said rear cover and said brush holder and cover body, respectively; and

means for pressing said brush holder, said cover body and said seal members toward said frame in the axial direction by said rear cover to assemble said brush holder, said cover body, and said seal members.

4,959,577

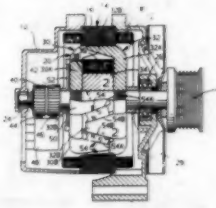
ALTERNATING CURRENT GENERATOR

Thomas A. Radomski, Utica, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Oct. 23, 1989, Ser. No. 425,270

Int. Cl.[5] H02K *1/22*

U.S. Cl. 310—263 **2 Claims**



1. An alternating current generator comprising, frame means, a stator supported by said frame means comprising a stator core formed of magnet material that has slots, an output winding carried by said stator core including conductors disposed within said slots, a rotor supported by rotation by said frame means disposed within said stator core, said stator core and rotor being spaced to provide an air gap between said rotor and stator core, said rotor comprising a shaft, first and second claw-pole members formed of magnetic material carried by said shaft, said first claw-pole member having a plurality of first circumferentially spaced and axially extending pole fingers, said second claw-pole member having a plurality of second circumferentially spaced and axially extending pole fingers, said first and second claw-pole members being so oriented on said shaft that the pole fingers of said first and second claw-pole members are interleaved, a rotor core formed of magnetic material carried by said shaft interposed between said claw-pole members having opposite ends respectively engaging said claw-pole members, a field coil disposed about said rotor core, slip rings carried by said shaft electrically connected to opposite sides of said field coil, brushes engaging said slip rings adapted to be connected to a source of unidirectional current to energize said field coil, a plurality of permanent magnets respectively interposed between said first and second circumferentially spaced axially extending pole fingers, each permanent magnet having a first end face engaging a side surface of said circumferentially spaced axially extending first pole finger and a second opposite end face engaging a side surface of said circumferentially spaced axially extending second pole finger, said end faces of said permanent magnets having opposite magnetic polarities and said magnets being so oriented that magnet end faces of like magnetic polarity respectively engage opposed side surfaces of a given pole finger, said first and second claw-pole members and said rotor core member defining a closed magnetic circuit formed entirely of magnetic material that magnetically connects opposed end faces of all said permanent magnets, said magnetic circuit shunting said air gap between said rotor and stator core whereby the flux developed by said permanent magnets is diverted from said air gap by said magnetic circuit and only

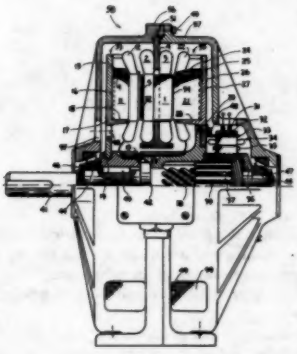
leakage flux developed by said permanent magnets traverses said stator core when said field coil is not energized, said field coil when energized with unidirectional current developing a field mmf in said magnetic circuit that is in such a direction as to oppose the mmf developed by said permanent magnets in said magnetic circuit whereby flux developed by said permanent magnets is caused to traverse said air gap through a path that includes adjacent first and second pole fingers, the flux developed by said field coil traversing said air gap and being applied to said stator core by said first and second pole fingers, the amount of permanent magnet flux applied to said stator core increasing as the unidirectional current applied to said field coil increases.

4,959,578

DUAL ROTOR AXIAL AIR GAP INDUCTION MOTOR

Joseph S. Varga, Little Rock, Ark., assignor to Axial Electric, Inc., Sherwood, Ark.

Filed Nov. 24, 1987, Ser. No. 125,615
Int. Cl.[5] H02K 1/22, 23/44
U.S. Cl. 310—268 **7 Claims**



1. An axial air gap type induction machine comprising:
a housing;
a shaft rotatably mounted in said housing;
a centrally located stator circumferentially surrounding said shaft and attached to said housing;
a first end rotor disposed on one side of said stator and firmly mounted to said shaft;
a second end rotor disposed on the other side of said stator and moveably mounted on said shaft, the movement of said second rotor being bidirectional about the circumference of said shaft, the movement of said second rotor causing phase shifting of both rotors, resulting in speed control of said induction machine; and
shifting means for turnably positioning the second end rotor in respect to the first end rotor.

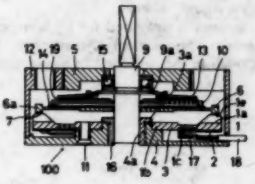
4,959,579

ULTRASONIC MOTOR

Yasuo Kuwabara; Naofumi Fujie, both of Nagoya, and Takao Saeki, Chiryu, all of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Jul. 19, 1989, Ser. No. 381,949
Claims priority, application Japan, Jul. 29, 1988, 63-191951
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—323 **13 Claims**

1. An ultransonic motor comprising:
stator means for generating a traveling wave;
rotor means operably engaged the stator means and driven by the traveling wave on the stator means;
spring means for generating a pressure pressing the rotor means toward the stator means; and



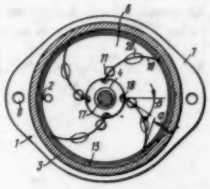
a stiff body disposed between said spring means and said rotor means for distributing the pressure from said spring means uniformly to the rotor means.

4,959,580

PIEZOELECTRIC MOTOR

Vladimir S. Vishnevsky, and Vyacheslav V. Lavrinenko, both of Kiev, U.S.S.R., assignors to Kievsky Politekhnichesky Institut Imeni, Kiev, U.S.S.R.

PCT No. PCT/SU87/00027, § 371 Date Oct. 24, 1988, § 102(e) Date Oct. 24, 1988, PCT Pub. No. WO88/06816, PCT Pub. Date Sep. 7, 1988
PCT Filed Feb. 26, 1987, Ser. No. 283,486
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—323 **2 Claims**



1. A piezoelectric motor comprising a stator (1) having a housing (7); a rotor (3) frictionally interacting with said stator (1); a piezoelectric radial mode oscillator (6) mounted on said housing (7), said oscillator comprising a piezoelectric cell (9) disposed coaxially to the rotor (3) and made in the form of a disk (12) with electrodes (13) and defining major flat top and bottom surfaces (50), said disk (13) being polarized perpendicular to said electrodes (12); at least two pushers (10), each pusher having one end secured on said peizoelectric cell (9) and having another end resting against said rotor (3), one end of each pusher (10) being secured on at least one flat major surface (50) of said piezoelectric cell (9) so that a gap (14) is provided between said at least one flat major surface (50) of said piezoelectric cell (9) and an associated pusher (10).

4,959,581

SERVO VALVE HAVING A PIEZOELECTRIC ELEMENT AS A CONTROL MOTOR

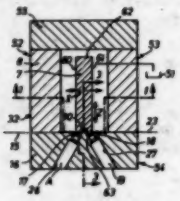
Jörg Dantlgraber, Lohr-Sackenbach, Fed. Rep. of Germany, assignor to Mannesmann Rexroth GmbH, Lohr, Fed. Rep. of Germany

Filed Nov. 14, 1988, Ser. No. 270,548
Claims priority, application Fed. Rep. of Germany, Nov. 13, 1987, 3738630
Int. Cl.[5] H01L 41/08
U.S. Cl. 310—328 **28 Claims**

1. An electrohydraulic pressure transducer apparatus comprising:
a control element comprising a piezoelectric element,

electrically actuated means for causing a movement of said control element for carrying out a control function so as to change a hydraulic output signal in accordance with an electric input signal, wherein

the control function is provided for by a front face of said control element, the moment of resistance of the control element is small in the direction of movement of the control element, but large in the direction in which the force created by the pressure of the hydraulic output signal acts, the front face of the control element has a recess defined therein which is connected with a source of pressure medium, and said recess is connected with stationary recesses which are connected with control ports in the housing or cover of the apparatus.



4,959,582

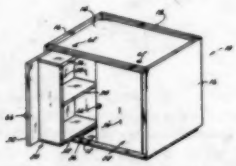
VIDEO STORAGE CABINET

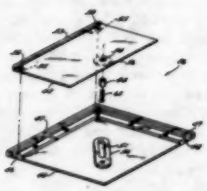
James M. Meyer, Oshkosh; David A. Schmidt, and Peter M. Donner, all of Oshkosh, Wis., assignors to Imago Quaestus, Inc., Oshkosh, Wis.

Filed Aug. 28, 1986, Ser. No. 901,143

Int. Cl.[5] A47B *88/00*

U.S. Cl. 312—307 **5 Claims**





1. A hinge assembly for supporting a storage type door for movement between an open position and a closed position in a cabinet, said assembly comprising a first plate in the form of a square adapted to be mounted in a cabinet, said first plate having a groove along two sides of the square, said groove intersecting at a right angle, supporting means defining an elongate guide track on said first plate, said guide track being aligned with a diagonal line drawn through the intersection of said grooves and the opposite corner of the square in said first plate, and a second plate adapted to be mounted on the storage door and having two guide members mounted on one edge of said second plate, said second plate being mounted on said first plate with said guide members aligned in one of the guide grooves and a pivot post mounted on said second plate and aligned in said guide track, whereby the portion of the door supported by the second plate will pivot within said square defined by said first plate in the cabinet on movement of the door between the open position and the closed position.

4,959,583

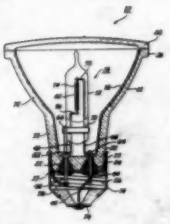
REFLECTIVE LAMPS HAVING AN IMPROVED LIGHT SOURCE MOUNTING ARRANGEMENT

Vito J. Arsena, Highland Heights; Harvey C. Clough, Cleveland Heights, and Frank E. Zalar, Euclid, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 31, 1989, Ser. No. 331,154

Int. Cl.[5] H01J *61/40, 5/48;* H01R *27/00*

U.S. Cl. 313—113 **10 Claims**



1. An electric lamp comprising:

(a) a reflector having an internal electrically conductive reflective surface and a bottom portion having at least a pair of openings extending therethrough;

(b) a base section affixed to said bottom portion of said reflector;

(c) a light source having at least a pair of electrical conductors extending out of its bottom portion;

(d) means for electrically connecting said electrical conductors of said light source to said base section comprising at least a pair of electrically conductive post members extending through said openings and connected to said pair of electrical conductors; and

(e) means consisting of a cement substance within said openings for solely and spatially disposing said light source within said reflector and a barrier means within said openings to prevent said cement substance from entering the inner confines of said reflector.

4,959,584

LUMINAIRE FOR AN ELECTRODELESS HIGH INTENSITY DISCHARGE LAMP

John M. Anderson, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 23, 1989, Ser. No. 370,664

Int. Cl.[5] H01J *1/50, 63/02*

U.S. Cl. 313—160000 **32 Claims**

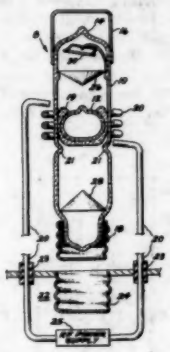
1. A luminaire, comprising:

a replaceable lamp comprising an elongated, light-transmissive envelope and a light-transmissive arc tube disposed within said envelope for containing a fill, said envelope having a base;

an excitation coil disposed about said envelope for exciting an arc discharge in said fill; and

socket means for receiving the base of said envelope,

coil retaining means for supporting said excitation coil, said coil retaining means being adapted to be connected to a



radio frequency power supply for coupling radio frequency power to said fill.

4,959,585

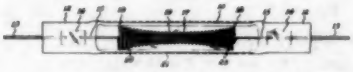
ELECTRIC INCANDESCENT LAMP AND METHOD OF MANUFACTURE THEREFOR

Leonard E. Hoegler, Solon; Gerald A. Johnson, Chagrin Falls; Diana M. Essock, Moreland Hills, and Kent K. Kipling, Solon, all of Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 6, 1988, Ser. No. 240,336

Int. Cl.[5] H01J *1/94, 19/48, 9/02*

U.S. Cl. 313—271 **61 Claims**



1. Ligth source means for an electric incandescent lamp having as the incandescent filament a continuous lenght of refractory metal wire formed directly into an elongated coil having a central axis and with coil turns at both ends of the elongated coil having a different diameter than the diameter of the central coil turns, at least one of said central turns or the end turns having a diameter selected relative to the inner diameter of an incandescent lamp in which said filament is to be used so as to be in close proximity or in actual physical abutment with a portion of the inner walls of said lamp so as to enable said filament to be coaxial with the longitudinal axis of said lamp when so inserted.

4,959,586

ELECTRIC INCANDESCENT LAMP

Stephanus J. Claessens, and Laurent H. T. Dumets, both of Turnhout, Belgium, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 11, 1989, Ser. No. 350,825

Claims priority, application Netherlands, May 24, 1988, 8801325

Int. Cl.[5] H01K *1/18*

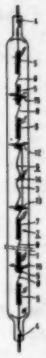
U.S. Cl. 313—273 **2 Claims**

1. An electric incandescent lamp comprising:

a. an elongated, light transmissive envelope sealed in a vacuum tight manner;

b. first and second conductors extending through respective portions of the envelope;

c. a continuous tungsten wire filament extending longitudinally in the envelope from the first conductor to the second conductor, said filament forming at least first and second helically wound light-emitting sections and a non-light-emitting section for spacing apart said first and second light-emitting sections, said non-light-emitting section having first and second helically wound portions formed at opposite ends thereof;



d. an additional tungsten wire extending longitudinally in the envelope adjacent the non-light-emitting section and having first and second helically wound portions formed at opposite ends thereof, said helically wound portions being wound around the respective helically wound portions of said non-light-emitting section; and

e. means for supporting the filament in the envelope at said helically wound portions of the additional tungsten wire.

4,959,587

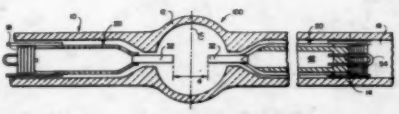
ARC TUBE ASSEMBLY

Stanley M. Schug, Monroeville, Ohio, assignor to Venture Lighting International, Inc., Oakwood Village, Ohio

Filed Jan. 13, 1989, Ser. No. 296,772

Int. Cl.[5] H01J *9/18, 9/32, 61/36*

U.S. Cl. 313—623 **37 Claims**



1. An improved arc tube assembly for a high-intensity metal halide lamp, comprising:

(a) an arc tube discharge envelope assembly including:

(1) a glass arc tube envelope forming a cavity adapted to receive a pair of electrodes therein, and

(2) a pair of glass side arms with capillaries rigidly fused to said arc tube envelope on opposite sides thereof and coaxial therewith, each of the side arms being adapted to receive one electrode assembly therein; and

(b) a pair of electrode assemblies positioned one each in said side arms and comprising in combination:

(1) an elongated quartz slug with beveled edges in a substantially square cross section having a forward end tapered inwardly on each side and terminating with a flat face square in cross section, and a flat rearward end

substantially square in cross section with a transverse groove therein,

(2) a rod shaped electrode coaxial with said slug and abutting the forward end thereof,

(3) four molybdenum foils each overlying one side of said slug, each of said foils having a tapered front end projecting beyond said slug and attached to said electrode and a rear end having a tab rearwardly extending therefrom, and

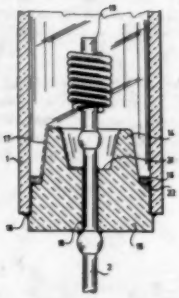
(4) an electrical lead attached to the tabs at the rear end of said foils, said electrode assemblies being intimately fused to said side arms with said electrodes protruding into said arc tube envelope through said capillaries with said electrical leads projecting rearwardly from said side arms.

4,959,588

DISCHARGE LAMP HAVING A DISCHARGE VESSEL MADE WITH A CERAMIC CLOSING MEMBER WITH AN INDENTED INNER SURFACE

Dénes Vida, and Péter Ferenci, both of Budapest, Hungary, assignors to Tungsram RT, Budapest, Hungary

Filed Mar. 23, 1989, Ser. No. 327,892
Claims priority, application Hungary, Mar. 28, 1988, 1533/88
Int. Cl.[5] H01J *61/36*
U.S. Cl. 313—625 7 Claims



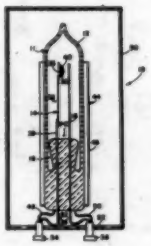
1. In a high-pressure gas discharge lamp, particularly a high-pressure sodium vapor lamp, comprising a tubular discharge vessel enclosing a discharge space; said discharge vessel being made of a ceramic material and including electrodes and a filling, said filling consisting of at least one ionizable rare gas and a metal additive; ceramic plug elements respectively mounted at each end of said discharge vessel for closing the end regions of said discharge vessel, said ceramic plug elements each having a current lead-in passing therethrough for connecting said electrode with an outer source of supply voltage, said ceramic plug elements each forming front surfaces of said discharge space, at least one of said front surfaces having surface elements of different height levels to form a cold chamber for receiving said metal additive, wherein the shortest electrical conduction path between the surface of the metal additive and the current lead-in as measured along said front surface is at least 4 mm.

4,959,589

GLOW DISCHARGE STARTER HAVING DISCHARGE EXTINGUISHING MEANS

Nikolaos Barakitis, Salem; Sheppard Cohen, Danvers, and Gregory Zaslavsky, Brookline, all of Mass., assignors to GTE Products Corporation, Danvers, Mass.

Filed Nov. 28, 1988, Ser. No. 276,837
The portion of the term of this patent subsequent to Mar. 27, 2007, has been disclaimed.
Int. Cl.[5] H01H *61/00*
U.S. Cl. 315—58 10 Claims



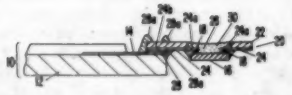
1. A glow discharge starter comprising an hermetically sealed discharge envelope containing an ionizable medium, a bimetallic electrode and a counter electrode and a capacitor having a main body and a pair of conductors extending from said main body and electrically coupling respective electrodes of said discharge envelope, said main body of the capacitor being in a thermal relationship with said discharge envelope to be responsive to heat generated in said discharge envelope; said capacitor being adapted to create a short circuit within said main body of said capacitor to thereby extinguish the discharge within said discharge envelope when a maximum temperature limit is reached.

4,959,590

LEAD CONNECTION STRUCTURE

Kenzo Hatada, Katano, and Koichi Nagao, Chigasaki, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 18, 1986, Ser. No. 943,198
Int. Cl.[5] H05B *33/06*
U.S. Cl. 315—169.3 11 Claims



1. A lead connection structure comprising:

a base substrate on which at least one electrode is disposed;

film tape comprising a flexible base and a pattern of electrically conductive material disposed on said flexible base, said film tape disposed against each said at least one electrode with said conductive material in an electrically conductive relationship with said at least one electrode, a connecting area being defined beside the location at which said film tape is disposed against said at least one electrode; and

insulating resin disposed between said at least one electrode and said electrically conductive material and covering said connecting area, said insulating resin having been stiffened by the application of light thereto, and said film tape being mechanically coupled to said base substrate due to the application of light to the insulating resin disposed

between said at least electrode and said electrically conductive material and covering said connecting area.

4,959,591

RECTIFIER-INVERTER CIRCUIT WITH LOW HARMONIC FEEDBACK, PARTICULARLY FOR OPERATION OF FLUORESCENT LAMPS

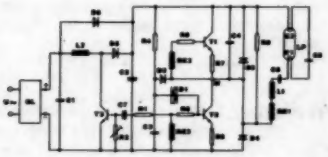
Walter Hirschmann, Munich, Fed. Rep. of Germany, assignor to Patent Treuhand Gesellschaft für elektrische Glühlampen m.b.H., Munich, Fed. Rep. of Germany

Filed Aug. 2, 1989, Ser. No. 388,642

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829388

Int. Cl.[5] H05B *41/29*

U.S. Cl. 315—209 R **19 Claims**



1. Rectifier - inverter circuit for operation of a load (LP) by supplying the load with electrical energy from an a-c power network, at an elevated frequency high with respect to the power network frequency, having

a rectifier circuit (GL) coupled to the power network;

a first capacitor (CI) connected across the output terminals of rectifier;

a push-pull oscillator circuit for providing said electrical energy at said elevated frequency, coupled to the output of the rectifier, said push-pull oscillator circuit including two transistors (T1, T2),

a feedback circuit including a transformer having a first winding (RK1) in circuit with the load, and feedback winding means (RK2, RK3) in circuit with the transistors;

an inductance (L1) connected between the output of the oscillator circuit and the load (LP); and

an active harmonic filter circuit forming an elevated voltage maintenance, or step-up converter circuit coupled to the output of the rectifier circuit including

a switching transistor (T3) having its switching path connected across the rectifier output;

a choke (L2) in series with the switching path of said switching transistor, and

a diode (D5) and a second capacitor (C2) circuit, coupled in circuit with the switching path of the transistor,

and comprising, in accordance with the invention,

means for controlling the switching of the switching transistor (T3) and for ensuring synchronous operation of the switching transistor and the oscillator circuit including

circuit connection means (C7, R1) coupled to said oscillate circuit and to the control electrode of the switching transistor (T3) to control switching of the switching transistor from the same source of energy which provides the elevated frequency energy.

4,959,592

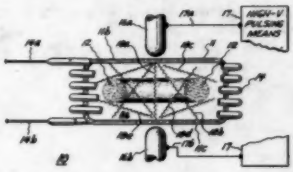
STARTING ELECTRODES FOR HID LAMPS

John M. Anderson, Scotia, and Victor D. Roberts, Burnt Hills, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 208,514, Jun. 20, 1988, abandoned. This application Oct. 26, 1989, Ser. No. 427,058

Int. Cl.[5] H05B *41/24*

U.S. Cl. 315—248 **6 Claims**



1. A high-intensity discharge lamp comprising:

a radio-frequency (RF) excitation coil having a bore;

an envelope situated within said RF excitation coil bore, having opposed first and second surfaces and an axis of symmetry, and containing means for sustaining a discharge plasma responsive to the RF magnetic field of said excitation coil; and

starting electrode means, adapted to receive a starting signal pulse, for providing at least one spark channel within the envelope to at least assist in the initiation of the discharge plasma when said starting pulse signal is received, and including: a first conductive electrode positioned entirely beyond said first surface, with respect to said envelope, and adjacent to said first surface; and a second conductive electrode positioned entirely beyond said second surface, with respect to said envelope, and adjacent to said second surface; each of the elongated electrodes being aligned substantially along said axis and in a direction opposite to one another and away from envelope.

4,959,593

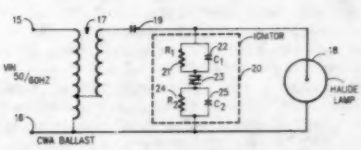
TWO-LEAD IGNITER FOR HID LAMPS

Fernando A. Joanino, Skokie, Ill., assignor to North American Philips Corporation, New York, N.Y.

Filed Feb. 15, 1989, Ser. No. 311,559

Int. Cl.[5] H05B *41/18*

U.S. Cl. 315—290 **13 Claims**



1. Apparatus for starting and operating a high intensity discharge (HID) lamp comprising:

a pair of input terminals for connection to a source of AC supply voltage,

a ballast device coupling a discharge lamp to said pair of input terminals, and

a starter-igniter device having first and second terminals coupled to first and second electrodes, respectively, of the discharge lamp via a circuit that excludes said ballast device, said starter-igniter device comprising:

a first network including a resistor and capacitor connected in parallel,

a second network including one or more passive circuit elements,

a bidirectional voltage-responsive switching device included in one of said first and second networks, and

means connecting said first and second networks in a series circuit between said first and second terminals of the starter-igniter device.

4,959,594

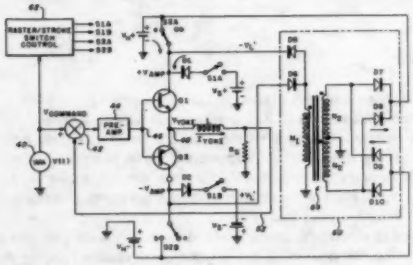
POWER SAVING ELECTROMAGNETIC DEFLECTION DISPLAY SYSTEM FOR DUAL MODE DEFLECTION AMPLIFIER

Joseph H. Ruby, Glendale, Ariz., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Nov. 1, 1989, Ser. No. 430,216

Int. Cl.[5] H01J *29/70, 29/76*

U.S. Cl. 315—397 **9 Claims**



1. In an electromagnetic deflection system for a CRT display of the type including means for providing deflection signals, deflection amplifier means, a deflection coil for causing movements of an electron beam across said CRT display, and a plurality of power supply means, said display system providing bi-directional raster mode output power during a bi-directional raster mode of operation and stroke mode output power during a stroke mode of operation for powering said deflection display means, said deflection amplifier means providing raster mode output power during first and second predetermined raster scan time intervals, and means for raster scanning at least a portion of said CRT display, said first and second raster scan intervals corresponding to opposing directions of deflection by said deflection display means, deflection display means comprising:

energy storage means operative in said second predetermined raster scan interval for receiving at least a portion of said raster mode output power provided during said first predetermined raster scan interval,

first switching means coupled to said deflection coil and said energy storage means for directing said portion of output power to said energy storage means during said second predetermined raster scan interval, and

second switching means connected to said plurality of power supply means and said energy storage means for selectively returning said directed portion of bi-directional raster mode output power to a predetermined one of said plurality of power supply means during said second predetermined raster scan interval.

4,959,595

ROTATING ELECTRIC MACHINE HAVING A COIL COAXIAL WITH ROTATING SHAFT

Shinji Nishimura, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 18, 1989, Ser. No. 298,434

Claims priority, application Japan, Feb. 12, 1988, 63-17725[U]

Int. Cl.[5] H02K *23/52;* **F02N** *11/04*

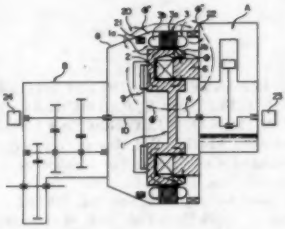
U.S. Cl. 318—138 **8 Claims**

1. A rotating electric machine comprising:

a field coil wound and disposed coaxially around a central rotational axis of said rotating electric machine;

current supplying means for supplying an electric current to said field coil;

a rotor disposed coaxially with said field coil and including a field pole forming means for forming circumferentially alternating field poles on a circumference of said rotor when excited by a magnetic flux formed by said field coil supplied with the electric current from said current supplying means;



an armature including armature coils disposed around said rotor to oppose said circumference of said rotor with a radial gap; and

electromagnetic means for electromagnetically minimizing a magnetic flux density in the neighborhood of said central rotational axis.

4,959,596

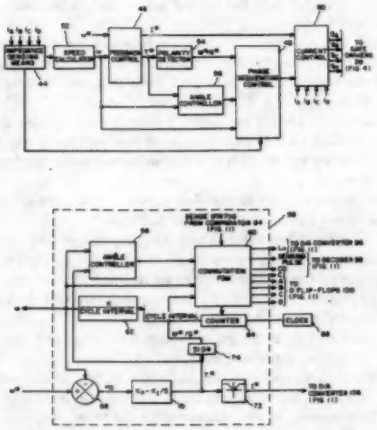
SWITCHED RELUCTANCE MOTOR DRIVE SYSTEM AND LAUNDERING APPARATUS EMPLOYING SAME

Stephen R. MacMinn, Schenectady; Charles M. Stephens, Pattersonville, and Paul M. Szczesny, Burnt Hills, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Apr. 3, 1989, Ser. No. 332,205

Int. Cl.[5] H02P *8/00*

U.S. Cl. 318—254 **30 Claims**



1. In combination, a closed-loop drive system for a multiphase switched reluctance motor including a rotor having a plurality of rotor poles and a stator having a plurality of pairs of opposing stator poles, each respective phase of said motor comprising at least one of said pairs of opposing stator poles with a motor phase winding wound thereon, each said motor

phase winding being connected in series with at least one corresponding current switching device, said switched reluctance motor being capable of four quadrant operation, said drive system comprising:

a plurality of current sensing means, each respective one of said current sensing means coupled to the corresponding current switching device for sensing instantaneous current in the motor phase winding connected thereto and for generating phase current signals proportional to said instantaneous current;

a plurality of indirect impedance sensing means, each respective one of said impedance sensing means coupled to the corresponding current sensing means of the respective phase of said motor for receiving said phase current signals and generating rotor position information signals in accordance therewith;

speed calculation means for generating actual motor speed signals from said rotor position information signals;

feedback control means for receiving and processing said actual motor speed signals from said speed calculation means and for receiving an operator command to generate a current command, a torque command and a mode command;

angle control means connected to said feedback control means for receiving and converting said torque command and said motor speed signals into a pulse train of conduction angle pulses synchronized with rotor position for each respective phase of said motor, the pulse trains for the respective phases of said motor being mutually phase-shifted;

phase sequencing control means for receiving and processing said motor speed signals and said mode command, said phase sequencing control means coordinating said pulse trains, said motor speed signals and said mode command with a particular quadrant of motor operation; and

current control means for receiving and comparing said current command from said feedback control means with said phase current signals to generate a current magnitude limiting signal for each respective phase of said motor.

4,959,597

NUMERICAL CONTROL APPARATUS

Hideaki Kawamura, Hachioji; Kentaro Fujibayashi, Musashino, and Toshiaki Otsuki, Hino, all of Japan, assignors to Fanuc Ltd, Minamitsuru, Japan

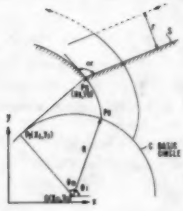
PCT No. PCT/JP88/00761, § 371 Date Feb. 8, 1989, § 102(e) Date Feb. 8, 1989, PCT Pub. No. WO89/01195, PCT Pub. Date Feb. 9, 1989

PCT Filed Jul. 28, 1988, Ser. No. 314,057

Claims priority, application Japan, Jul. 30, 1987, 62-191343

Int. Cl.[5] G05B *19/445*

U.S. Cl. 318—568.15 **11 Claims**



1. A numerical control apparatus having a tool control function for machining a workpiece into a shape along an involute curve, comprising:

setting means for setting an approximation circle approximating the involute curve in accordance with an intersection angle at a command point commanding the start of machining along the involute curve;

arithmetic means for computing a command point offset vector at the command point based on both the approximation circle and a tool offset quantity of a tool trajectory up to the command point; and

interpolating means for interpolating the involute curve as offset by a tool diameter based on the command point offset vector.

4,959,598

METHOD AND APPARATUS FOR CONTROLLING TORQUE OF A DOOR OPENING AND CLOSING MOTOR FOR AN AUTOMATIC DOOR

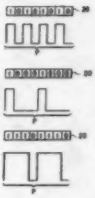
Yukio Yoshida, Namerikawa; Akiyoshi Takimoto, Toyama, and Shigenobu Murai, Uozu, all of Japan, assignors to Yoshida Kogyo K.K., Tokyo, Japan

Continuation of Ser. No. 112,407, Oct. 26, 1987, abandoned. This application Sep. 19, 1989, Ser. No. 411,185

Claims priority, application Japan, Oct. 27, 1986, 61-253689

Int. Cl.[5] H02P *7/29*; G05B *11/28*

U.S. Cl. 318—599 **5 Claims**



1. A method of controlling torque of a door opening and closing motor for an automatic door, said motor being such a motor that a rotary torque therein is generated on the basis of control pulses applied to said motor from a control unit, its rotary torque being regulated by changing a total pulse width of said control pulses rising in one repetition cycle thereby controlling an acceleration of said motor, said method comprising the steps of: (I) in an accelerating operation of the door;

(I-a) measuring a first door moving distance L_1 passed by the door during a period when the door reaches its highest speed condition starting from its stop condition;

(I-b) comparing said first door moving distance L_1 with an optimum acceleration distance range L_{11}–L_{12} set in said control unit;

(I-c) changing a total pulse width of said control pulses arising in one repetition cycle on the basis of a result of said comparing step (I-b); and

(I-d) accelerating the door by applying the control pulses as changed in said changing step (I-c) to said motor upon a next door accelerating operation; (II) in a decelerating operation of the door;

(II-a) measuring a second door moving distance L_2 passed by the door during a period when the door once stops after starting from its highest speed condition;

(II-b) comparing said second door moving distance L_2 with an optimum deceleration distance range L_{21}–L_{22} set in said control unit;

(II-c) changing a total pulse width of said control pulses arising in one repetition cycle on the basis of a result of said comparing step (II-b); and

(II-d) decelerating the door by applying the control pulses as changed in said changing step (II-c) to said motor upon a next door decelerating operation; whereby the door accelerating and decelerating operations can be always regulated in an optimum range.

3. An apparatus for controlling torque of a door opening and closing motor for an automatic door in which said motor is

such a motor that the torque thereof is generated on the basis of controlling the total pulse width applied to said motor from a control unit, comprising means for regulating the total pulse width by changing the total pulse number of control pulses occurring in one cycle and means for determining whether acceleration of said motor is in a predetermined range, said acceleration determining means supplying change total pulse number signals to said regulating means when acceleration is not in said predetermined range, whereby acceleration of said motor is controlled.

4,959,599

HEAD POSITIONER

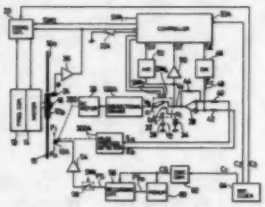
Katsuo Nakadai; Izumi Miyake; Kiyotaka Kaneko, and Kazuya Oda, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 864,685, May 19, 1986, Pat. No. 4,811,133. This application Nov. 8, 1988, Ser. No. 268,443

Claims priority, application Japan, May 22, 1985, 60-109512; May 23, 1985, 60-111252; Jun. 10, 1985, 60-125289; Aug. 16, 1985, 60-180742; Sep. 19, 1985, 60-207353; Sep. 28, 1985, 60-215606; Sep. 30, 1985, 60-217739; Nov. 1, 1985, 60-245927; Nov. 2, 1985, 60-246831; Nov. 13, 1985, 60-255685

Int. Cl.[5] H02P *5/46*; G05B *19/28*

U.S. Cl. 318—603 **6 Claims**



1. A bidirectional d.c. motor driving circuit with a speed servo, comprising

a comparator receiving a single-pole speed control voltage at one input terminal and a feedback signal at another terminal, and producing an error control voltage at an output terminal, the level of said feedback signal fluctuating according to a d.c. motor speed;

a first operational amplifier for receiving said error control voltage at a first input terminal and a motor stop voltage at a second input terminal, the level of said motor stop voltage being set at a predetermined level and having the same polarity as said error control voltage;

a second operational amplifier for receiving said motor stop voltage at a first iaput terminal corresponding in polarity to the first input terminal of said first operational amplifier and said error control voltage at a second input terminal corresponding in polarity to the second terminal of said first operational amplifier;

a first driving circuit having an input terminal connected to an output terminal of said first operational amplifier and an output terminal connected to one terminal of said d.c. motor;

a second driving circuit having an input terminal connected to an output terminal of said second operational amplifier and an output terminal connected to another terminal of said d.c. motor through a first resistor;

a second resistor and a third resistor being connected in series between the output terminals of said first and second driving circuits, said second and third resistors together with said d.c. motor and said first resistor constituting a bridge circuit; and

a differential amplifier for a speed servo, said differential amplifier receiving at one input terminal a voltage produced at a junction between said another terminal of said d.c. motor and said first resistor, receiving at another input terminal a voltage produced at a junction between said second and third resistors, and producing said feedback signal corresponding to the difference between both voltages

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4,959,600

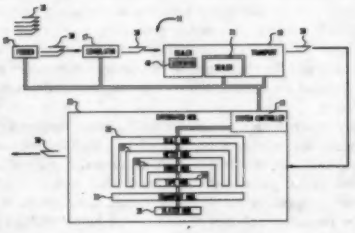
MICROPROCESSOR SYSTEM CONTROLLER FOR MAIL PROCESSING SYSTEM APPLICATIONS

Peter C. DiGiulio, Bridgeport; Norman J. Bergman, Danbury; Frank D. Ramirez, Stamford, and Edilberto I. Salazar, Brookfield, all of Conn., assignors to Pitney Bowes Inc., Stamford, Conn.

Filed Dec. 8, 1988, Ser. No. 281,355

Int. Cl.[5] G06F *15/46*

U.S. Cl. 318—625 **18 Claims**



1. A motor controller system for controlling the respective motors of a plurality of cooperative apparatus associated with an article processing system, said article processing system for performing a plurality of functions upon an article traversing said article processing system, comprising:

a motor driver board having a plurality of input channels and a plurality of respective output channels;

said motors being in line communication with a respective one of said output channels of said motor driver board;

a programmable microprocessor in bus communication with said driver board's input channels;

a plurality of sensors respectively mounted to each of said apparatus and in bus communication with said programmable microprocessor, said sensors being located on said apparatus to provide such information to said microprocessor as article size, position and velocity information and to provide apparatus operation information; and,

said microprocessor being programmed such that a cycle is performed at a desired frequency, each control cycle being divided into discrete time intervals during which respective time interval said microprocessor transmits motor control command information to said driver board for respective motors and during other of said time intervals said microprocessor reads information from said sensors.

4,959,601

DRIVING DEVICE FOR A STEPPING MOTOR

Noriyuki Kikugawa, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,481

Claims priority, application Japan, Feb. 23, 1988, 63-038531

Int. Cl.[5] H02P *8/00*

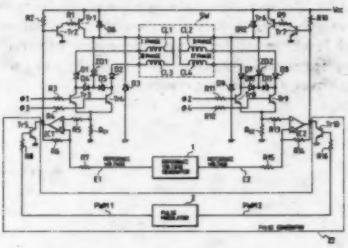
U.S. Cl. 318—696 **3 Claims**

1. A stepping motor driving device for supplying electric power to a coil of each phase, comprising:

means for producing a phase signal for exciting the supply of electric power to said coil of each phase;

coil driving means for effecting the supply of electric power to said coil by the signal of said phase signal producing means;

phase current detecting means for producing a signal corresponding to phase current in said coil;
means for producing a reference signal;
means for controlling the supply of electric power to said coil, said means including:
means for comparing said reference signal with the signal from said phase current detecting means; and
control means responsive to the signal of said comparing means to control the supply of electric power to said coil; and



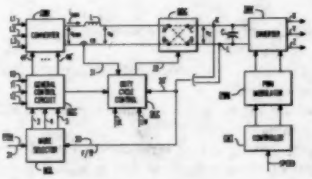
pulse generator means for generating a variable width pulse of a predetermined period, said pulse generator means being connected to said means for controlling the supply of electric power to said coil and controlling the operation time of said control means;
said pulse generator means being connected to a processor for producing a data signal for varying said variable width pulse, and said variable width pulse generator means including means for controlling the pulse width of a clock signal from said processor to a pulse width corresponding to the variable width, and means for comparing said data signal with the signal of said pulse width control means.

4,959,602

AC MOTOR DRIVE WITH IMPROVED VOLTAGE-SOURCE INVERTER

Kenneth C. Scott, San Diego, Calif., and Colin D. Schauder, Murrysville Boro, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jun. 2, 1989, Ser. No. 360,633
Int. Cl.[5] H02D *3/18*
U.S. Cl. 318—803 **3 Claims**



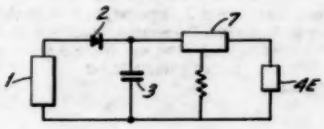
1. In an AC motor drive system including:
an AC/DC converter having three-phase AC input lines, opposite poles, main thyristors forming a bridge across said AC input lines and said poles and means for sequentially firing said main thyristors; a precharged DC-link capacitor across said poles; an inverter having AC output lines, DC terminals connecting said DC-link capacitor to the inverter, and an AC motor supplied by said AC output lines;
with first and second diode means operatively connected each between a corresponding pole of said thyristor bridge and an associated end of said DC-link capacitor for providing a current path between conducting main thyristors when the motor drive system is operating in one of the motoring and regenerating modes;
with additional first and second static switches cross-coupled between respective ends of said DC-link capacitor and respective poles of said thyristor bridge;
with means for controlling said first and second additional static switches (a) OFF for passing said current path through said DC-link capacitor in one direction when the motor drive is in the motoring mode and (b) ON for passing current in the opposite direction when the motor drive is in the regenerating mode, thereby to allow feedback from said DC terminals through said converter onto said AC input lines;
means for sensing the current of said current path to derive current representative signal;
one forced-commutated switch being used as one of said first and second additional static switches and an auxiliary thyristor being used as the other of said first and second additional static switches, said DC-link capacitor being bypassed (1) in the motoring mode by said forced-commutated switch when turned ON and (2) in the regenerating mode by said auxiliary thyristor being ON whereas said forced-commutated switch is turned OFF; the combination of:
current control loop means operative upon said controlling means for applying to said forced-commutated switch a duty-cycle OFF/ON in accordance with, respectively, a given excess and a given want of said current relative to a reference current related to a boost voltage for said DC-link capacitor;
voltage control loop means being provided to generate said reference current and responsive to a present voltage of said DC-link capacitor and to a predetermined desired voltage for voltage boosting thereof to derive a voltage error, the sign of said voltage error being changed to the opposite when in the regenerating mode, said current reference being established in relation to said voltage error;
whereby said current control loop is effective in establishing said forced-commutated switch duty-cycle.

4,959,603

SOLAR BATTERY EQUIPMENT

Shigeo Yamamoto, Kanagawa, and Toshio Noda, Hyogo, both of Japan, assignors to Osaka Titanium Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,445
Claims priority, application Japan, Oct. 27, 1987, 62-271328; Feb. 16, 1988, 63-033590; May 18, 1988, 63-121500
Int. Cl.[5] H02J *7/00*
U.S. Cl. 320—1 **7 Claims**



1. A solar battery system characterized by at least one solar cell for converting light energy to electrical energy which is stored in the system for use when light energy is not available, said solar battery system consisting essentially of:
at least one solar cell formed of a semiconductor selected from the group consisting of single crystal and polycrystalline substrates,
said solar cell having output terminals connecting said cell in parallel to an energy-storage capacitor, which capacitor is also connected in parallel with a loading circuit,
said capacitor being formed of compressed particles of

activated carbon of particle size sufficient to provide a specific surface of about 1,000,000 to 20,000,000 cm^2 per gram of activated carbon with voids between said particles having absorbed therein an aqueous solution of sulfuric acid, said capacitor being capable of storing electrical energy charged to it by said solar cell at a selected voltage level for the gradual discharge of said capacitor to said loading circuit when needed,

a diode coupled in series to an output terminal of said solar cell to prevent the flow of reverse current to said solar cell, and

a variable voltage regulator disposed between said capacitor and said loading circuit to maintain the power fed to said loading circuit from said capacitor substantially constant.

4,959,604

PROCESS FOR ULTRA-RAPIDLY CHARGING A SEALED NICKEL-CADMIUM STORAGE BATTERY

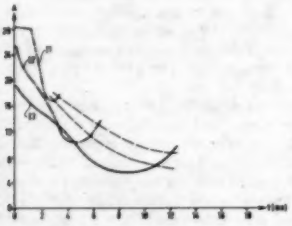
Rosendo Cuesta, Saint Loubes, France, assignor to Societe Anonyme dite: SAFT, France

Filed Dec. 1, 1988, Ser. No. 278,547

Claims priority, application France, Sep. 9, 1988, 88 11794

Int. Cl.[5] H01H *10/44*

U.S. Cl. 320—20 **3 Claims**



1. A process for ultra-rapidly charging a sealed nickel-cadmium storage battery, wherein the charging process comprises:

applying to the battery a charging voltage which is sufficient to complete the charging process in a time on the order of three to fifteen minutes but is lower than a voltage at which hydrogen is released in gaseous form, and

terminating the charging voltage when charging current intensity registers a significant increase following a gradual decrease.

4,959,605

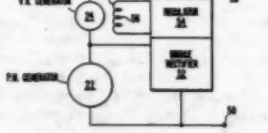
HYBRID PERMANENT MAGNET AND VARIABLE RELUCTANCE GENERATOR

Jayant Vaidya, and David J. Belanger, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 23, 1988, Ser. No. 275,576

Int. Cl.[5] H02K *21/00*

U.S. Cl. 322—10 **26 Claims**



1. A hybrid electrical generator comprising:

a permanent magnet generator having a permanent magnet rotor mounted on a shaft, the permanent magnet generator providing an output voltage over an operating range which falls in response to an increasing electrical load;

a variable reluctance generator having a rotor mounted on the shaft with excitation of a stator of the variable reluctance generator being provided from the permanent magnet generator, the variable reluctance generator providing an output voltage which varies in response to an increasing electrical load over an operating range; and

a voltage regulator, responsive to combined output voltages of the generators, for controlling the output voltage provided by the variable reluctance generator to cause the hybrid generator to produce a regulated output voltage which is substantially constant independent of variation of an applied electrical load coupled to the hybrid generator output over an operating range.

4,959,606

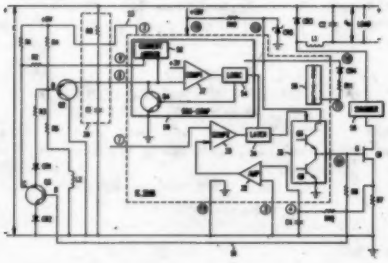
CURRENT MODE SWITCHING REGULATOR WITH PROGRAMMED OFFTIME

Charles O. Forge, Los Altos, Calif., assignor to Uniphase Corporation, San Jose, Calif.

Filed Jan. 6, 1989, Ser. No. 294,157

Int. Cl.[5] H02M *3/156*

U.S. Cl. 323—286 **13 Claims**



1. A power supply regulator comprising:

a common terminal;

an input terminal for applying a direct current input;

an output terminal;

a catch diode having a first terminal connected to the common terminal;

an inductor having a first terminal connected to a second terminal of the catch diode and a second terminal connected to the output terminal;

a capacitor having a first terminal connected to the common terminal, and a second terminal connected to the output terminal;

switch means connected between the second terminal of the catch diode and the input terminal for switching the direct current input between an on time and an off time; and

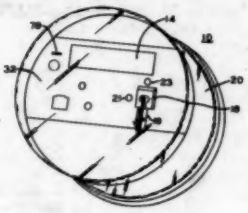
means operatively connected to the switch means for varying the off time of the switch means, wherein the duration of the off time is proportional to the difference between the voltage at the input terminal and the voltage at the output terminal divided by the voltage at the input terminal.

4,959,607

RESTRICTOR FOR MULTIPLE SWITCH EXTERNAL CONTROL ACTUATOR FOR ELECTRONIC ENERGY METER

Peter F. Coryea, Salem, and Warren R. Germer, Dover, both of N.H., assignors to General Electric Company, Somersworth, N.H.

Filed Sep. 25, 1989, Ser. No. 411,963
Int. Cl.[5] G01R 11/64, 11/24; H01H 3/00; G06C 15/42
U.S. Cl. 324—103 R 34 Claims



1. A switching mechanism for an electric energy meter having a transparent cover, a display, and a plurality of switches within said energy meter below said cover which may be selectively actuated from outside said cover to display selected information unless actuation is precluded by a switch restrictor comprising:

a plurality of switches disposed in a pattern within said energy meter and below said transparent cover;

an actuating mechanism including a switch actuator positioned on said transparent cover, extending into said energy meter and including means to move said switch actuator into contact with an axial shaft of a selected one of said plurality of switches;

each of said switches being actuated by depressing the axial shaft associated with the switch;

one or more selectively positionable switch restrictors positioned about the axial shafts of one or more of said switches to prevent said switch actuator from depressing said switch;

a groove within said meter surrounding at least a substantial portion of each of said axial shafts and spaced from the end of the axial shaft adjacent said switch actuator;

said switch restrictor having a first portion thereof which surrounds only a segment of said axial shaft, and a second portion which is dimensioned to fit within, and to be secured by, each said groove;

said restrictors being selectively removable from, and positionable about, one or more of said switches;

each of said restrictors when positioned around one of said switches precluding the depressing of such one of said switches by said switch actuator from outside said transparent cover while not precluding the depressing of said one of said switches from within said transparent cover;

whereby said switch restrictors enable selective restriction of the actuation of said switches from outside said transparent cover, while enabling actuation of all of such switches when said transparent cover is removed.

4,959,608

APPARATUS AND METHOD FOR EXTRACTING THE RMS VALUE FROM A SIGNAL

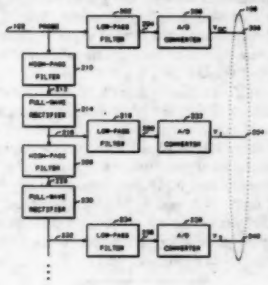
Norman G. Dillman, El Paso, Tex., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 16, 1989, Ser. No. 422,335
Int. Cl.[5] G01R 15/10, 19/22
U.S. Cl. 324—132 11 Claims

1. A measurement instrument for deriving an RMS signal from an input signal comprising:

DC component conversion means connected to said input signal for producing a digital value equivalent to the DC offset signal of said input signal;

a plurality of AC conversion stages connected in series for producing an output equivalent to the AC RMS signal, wherein a first of said AC conversion stages has an input connected to said input signal and wherein subsequent stages have an input connected to a previous AC conversion stage;



a plurality of analog to digital conversion stages, one analog to digital conversion stage connected to said output of each of said AC conversion stages, for converting said output to a digital value; and

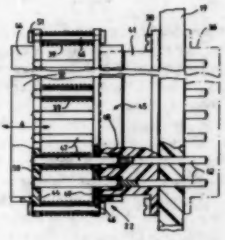
processing means for receiving each said digital value, squaring said digital value, adding said squared values producing a sum of squares, and outputting a square root of said sum of squares.

4,959,609

ELECTRICAL CONNECTING APPARATUS FOR AN ELECTRICAL OR ELECTRONIC TESTING UNIT

Manfred Prokopp, Am Felder 27, D-6980 Wertheim, Fed. Rep. of Germany, and Herbert Kaufmann, Cham, Switzerland, assignors to Manfred Prokopp, Wertheim, Fed. Rep. of Germany

Filed Jan. 23, 1989, Ser. No. 300,957
Claims priority, application Fed. Rep. of Germany, Jan. 27, 1988, 3802304
Int. Cl.[5] G01R 31/04; H01R 13/44
U.S. Cl. 324—158 F 24 Claims



24. A testing unit for contact strips having a multiplicity of terminal ends anchored in a strip body, said testing unit comprising:

an electrically insulating support plate displaceable toward and away from said strip body;

an electrically insulating further plate extending along and displaceable by said support plate;

a multiplicity of electrically conductive mutually parallel

contact pins positioned to register with said terminal ends anchored in said further plate and having contact ends engageable with said terminal ends, shanks extending to said contact ends from said further plate, and connecting end portions extending through said further plate and said support plate while projecting from said support plate away from said body;

an electrically insulating pressing member shaped to interfit with said strip body and spaced from said further plate;

a multiplicity of precompressed springs braced between said further plate and said pressing member for resisting displacement of said pressing member toward said further plate upon displacement of said support plate toward said body, at least some of said spring surrounding respective ones of said shanks; and

means limiting the displacement of said pressing member away from said further plate for disposing said contact ends of said pins substantially at a surface of said pressing member turned toward said body, whereby said contact ends remain retracted until said supporting plate is displaced toward said body and then grippingly engage said terminal ends, but said springs automatically draw said pins back into retracted positions upon displacement of said support plate away from said body and release said pressing member from said body.

4,959,610

MAGNETIC RESONANCE APPARATUS

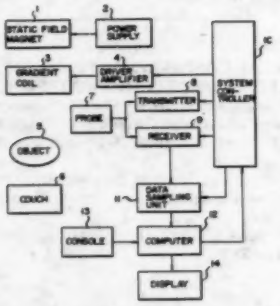
Yoshinori Suzuki, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Aug. 16, 1989, Ser. No. 394,675

Claims priority, application Japan, Sep. 30, 1988, 63-246456

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **14 Claims**



1. A magnetic resonance apparatus comprising:

signal acquiring means for obtaining a magnetic resonance signal matrix by repeating a series of sequences a plurality of times, the sequences including (a) applying a gradient field to an object to be examined which is placed in a uniform static field, and at the same time executing a selective inversion pulse application sequence for sequentially applying a plurality of selective inversion pulses having different frequencies as high-frequency fields onto the object, (b) applying a non-selective excitation pulse as a high-frequency field to the object without application of a gradient field, and (c) acquiring a magnetic resonance signal generated upon application of the non-selective excitation pulse, while the number and frequencies of selective inversion pulses are sequentially selected to cause a magnetization vector of a nuclear spin of an area corresponding to one of "−1" and "1" of an Hadamard matrix to be inverted by the selective inversion pulse application sequence; and

signal processing means for obtaining chemical shift information by transforming the magnetic resonance signal matrix obtained by said signal acquiring means in an aligning direction of the magnetic resonance signal matrix by an inverse Hadamard transform, and transforming the transformed magnetic resonance signal matrix in a time base direction by an inverse Fourier transform.

4,959,611

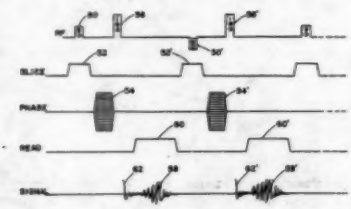
OUT-OF-SLICE ARTIFACT REDUCTION TECHNIQUE FOR MAGNETIC RESONANCE IMAGERS

Terrence J. Brovost, Cleveland Hts.; David A. Lampman, Lakewood, and Kenneth S. Foster, Eastlake, all of Ohio, assignors to Picker International, Inc., Highland Hts., Ohio

Filed Jun. 29, 1989, Ser. No. 373,344

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—309 **13 Claims**



1. A method of magnetic resonance imaging comprising:

measuring a magnetic resonance view attributable to out-of-slice magnetization;

measuring a plurality of views with different phase encodings;

subtracting the out-of-slice magnetization view from each of the phase encoded views to produce out-of-slice corrected phase encoded views; and,

transforming the out-of-slice corrected phase encoded views into an image representation.

4,959,612

METHOD OF HETERONUCLEAR DECOUPLING IN MAGNETIC RESONANCE SPECTROSCOPY, AND DEVICE FOR DETERMINING A SPECTRUM

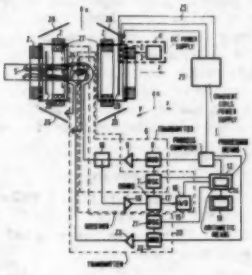
Peter R. Luyten, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed May 26, 1989, Ser. No. 358,326

Claims priority, application Netherlands, Aug. 17, 1988, 8802036

Int. Cl.[5] G01R *33/20*

U.S. Cl. 324—311 **20 Claims**



8. A device for determining a spectrum from at least one magnetic resonance signal, which device comprises means for generating a steady, uniform magnetic field, first transmitter

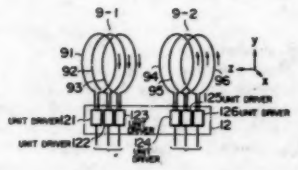
means for transmitting RF electromagnetic excitation pulses for exciting a first type of nucleus in an object, second transmitter means for transmitting inversion pulses to a second type of nucleus in the object, said second type of nucleus being spin-coupled to the first type of nucleus, in order to decouple the first type of nucleus from the second type of nucleus, receiver means for receiving resonance signals from the object, means for generating at least one magnetic field gradient, sampling means for sampling the magnetic resonance signal and display means for displaying the spectrum, and also comprises processing means which include programmed arithmetic means for determining the spectrum from sampling values obtained by means of the sampling means, the programmed means also being suitable for activating, at least during signal acquisition of the resonance signals, the second transmitter means in order to transmit the inversion pulses, characterized in that the programmed means are also suitable for controlling the second transmitter means so that the inversion pulses are pulses modulated in amplitude as well as in frequency or phase.

4,959,613

NMR IMAGING APPARATUS

Etsuji Yamamoto, Akishima, and Hideki Kohno, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Mar. 7, 1989, Ser. No. 319,728
Claims priority, application Japan, Mar. 8, 1988, 63-53942
Int. Cl.[5] G01R *33/20*
U.S. Cl. 324—318 **6 Claims**



1. An NMR imaging apparatus comprising:

static magnetic field generating means for generating a uniform static magnetic field in a first direction in a space to be observed; and

first, second and third field gradient generating means for generating in said space a first field gradient in said first direction and second and third field gradients in second and third directions orthogonal to said first direction and orthogonal to each other, respectively, at least one of said first, second and third field gradient generating means including a plurality of unit coils and a plurality of unit drivers for individually driving said unit coils respectively;

wherein each of said unit coils has a similar form and an inductance which is substantially equal to one another.

4,959,614

APPARATUS FOR DETERMINING MICROWAVE CHARACTERISTICS OF SUPERCONDUCTIVE MATERIALS USING A RESONANT CAVITY AND CALIBRATION WAVEGUIDES

Donald R. Bowling, and Charles F. Smith, both of Ridgecrest, Calif., assignors to The United States of America as Represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 3, 1989, Ser. No. 389,233
Int. Cl.[5] G01N *22/00*; H01P *7/06*
U.S. Cl. 324—636 **13 Claims**

1. Apparatus for determining microwave characteristics of a superconductive material having a transition temperature, the apparatus comprising:

an element constructed of said superconductive material;

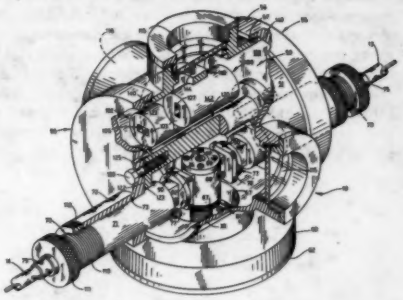
a body defining a resonant cavity for microwave energy and having means for mounting said element at said cavity for impingement by said energy;

a test waveguide extending from said body and terminating in a test waveguide junction;

a calibration waveguide extending along said test waveguide and terminating in a calibration waveguide junction;

a wall defining a vacuum chamber enclosing said body, said test waveguide, and said calibration waveguide;

a cold finger extending from said body through said wall to conduct heat from said body and maintain said element at



a temperature in a range of temperatures including said transition temperature;

a connecting waveguide terminating at one end in a connecting microwave junction and having an opposite end connectable to microwave analyzer equipment; and

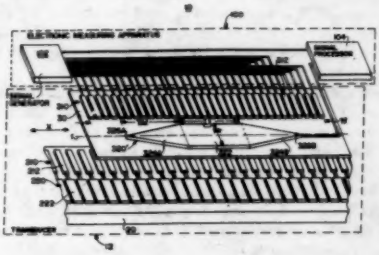
means for mounting said connecting waveguide on said wall with vacuum sealed movement relative to said wall so as to juxtaposition said connecting junction to one junction selected from said test junction and said calibration junction without loss of vacuum in said chamber and without substantial change in said temperature of said element.

4,959,615

ELECTRODE STRUCTURE FOR CAPACITANCE-TYPE MEASUREMENT TRANSDUCERS

Nils I. Andermo, Kirkland, Wash., assignor to Micro Encoder, Inc., Kirkland, Wash.

Continuation-in-part of Ser. No. 200,368, May 31, 1988, Pat. No. 4,879,508, which is a continuation-in-part of Ser. No. 30,346, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 31,049, Mar. 26, 1987, abandoned, and a continuation-in-part of Ser. No. 35,859, Apr. 8, 1987, abandoned. This application May 31, 1989, Ser. No. 359,699
Int. Cl.[5] G01R *27/26*
U.S. Cl. 324—690 **40 Claims**



1. A transducer comprising:

first and second support members, said support members

being relatively displaceable with respect to each other, and at least one of said support members being displaceable relative to a measurement axis;

first electrode means disposed on said first support member, and second electrode means disposed on said second support member and capacitively coupled to said first electrode means;

said first and second electrode means each having an elongate configuration extending in the direction of the measurement axis, and one of said first and second electrode means having two end portions configured such that the degree of coupling between said first and second electrode means decreases linearly relative to the measurement axis along the extent of each end portion, and such that the respective directions of the decrease in the degree of coupling for said two end members are opposite to each other, so that the effect of tilt between said first and second support members on a set of signals transferred between said first and second electrodes is reduced.

4,959,616

DIGITAL OSCILLATION APPARATUS

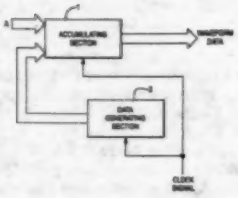
Tokikazu Matsumoto, c/o Matsushita Electric Industrial Co., Ltd., 1006, Kadoma, Osaka, 571, Japan

Filed Oct. 11, 1988, Ser. No. 255,267

Claims priority, application Japan, Oct. 13, 1987, 62-257556

Int. Cl.[5] H03B *19/00*; **H03K** *5/13, 4/02*; **G06F** *1/00*

U.S. Cl. 328—14 **8 Claims**



1. A digital oscillation apparatus for generating a periodic waveform data having a frequency fs comprising:

a data generating means responsive to each clock of a clock signal having a frequency fc for generating data used to periodically generate a data string having a constant total value of R with a period of m clocks so that the average value of each data of the data string generated in response to each clock of the clock signal is R/m, where each of R and m is an integer; and

an accumulating means having a dynamic range D, where D is an integer, and being responsive to each clock of the clock signal for accumulating a sum of each data of the data string generated by said data generating means and a constant A, wherein A is an integer, to obtain accumulated data until the accumulated data exceeds the dynamic range D and for subtracting the dynamic range D from the accumulated data when the accumulated data exceeds the dynamic range D, thereby generating a periodic waveform data having a frequency fs,

wherein the values of R, m, A and D satisfy a condition of $fs/fc=(A+R/m)/D$ so that the frequency fs of the periodic waveform data becomes $fs=(A+R/m)\cdot fc/D$.

4,959,617

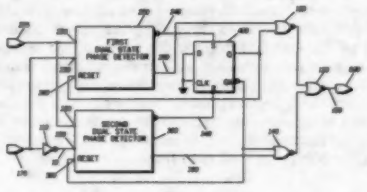
DUAL STATE PHASE DETECTOR HAVING FREQUENCY STEERING CAPABILITY

Frederick L. Martin, North Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed May 30, 1989, Ser. No. 357,912

Int. Cl.[5] H03K *9/06*; **H03D** *13/00*

U.S. Cl. 328—133 **6 Claims**



1. A phase detector for detecting the phase difference between a first input signal and a second input signal, comprising:

a first phase detecting means having a first predetermined phase detecting range for detecting the phase difference between said first input signal and said second input signal, to provide a first phase difference signal, said first phase detecting means including a first indicating means to indicate when said first predetermined phase detecting range is exceeded;

means for inverting said first input signal to provide a inverse of said first input signal;

a second phase detecting means having a second predetermined phase detecting range for detecting the phase difference between said second input signal and said inverse of said first input signal, to provide a second phase difference signal, said second phase detecting means including a second indicating means to indicate when said second predetermined phase detecting range is exceeded;

selecting means coupled to said first and second phase detecting means, said selecting means receives said first and second phase difference signals and is responsive to said first and second indicating means for selecting said first phase difference signal when said second predetermined phase detecting range is exceeded, and for selecting said second phase difference signal when said first predetermined phase detecting range is exceeded.

4,959,618

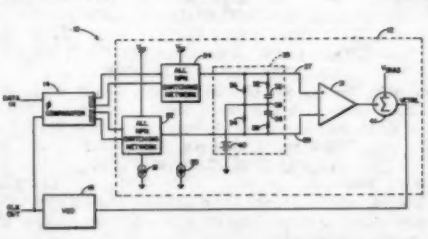
DIFFERENTIAL CHARGE PUMP FOR A PHASE LOCKED LOOP

John S. Shier, Apple Valley, Minn., assignor to VTC Incorporated, Bloomington, Minn.

Filed Feb. 16, 1989, Ser. No. 311,216

Int. Cl.[5] H03D *13/00*; **H03K** *9/06, 5/13*

U.S. Cl. 328—155 **10 Claims**



1. A charge pump for filtering and integrating first and second pulse trains for producing a voltage difference signal

proportional to the difference in relative duration of the pulses of the first and second pulse trains, the charge pump comprising:

a common node;

first capacitor means connected to the common node;

first current source means for generating a first source current;

a first switching circuit connected at a first terminal to the first capacitor means and at a second terminal to the first current source means and responsive to the first pulse train for passing the first source current through the first capacitor means from the common node;

second capacitor means connected to the common node;

second current source means for generating a second source current;

a second switching circuit connected at a first terminal to the second capacitor means and at a second terminal to the second current source means and responsive to the second pulse train for passing the second source current through the second capacitor means for the common node;

a differential amplifier connected at one input terminal to the first terminal of the first switching circuit and the remaining input terminal to the first terminal of the second switching circuit for generating the voltage difference signal; and

first discharge resistor means connected across the first capacitor means and second discharge resistor means connected across the second capacitor means.

4,959,619

DIGITAL TRANSMISSION DEMODULATOR INCLUDING AN AUTOMATIC FAULT CORRECTOR

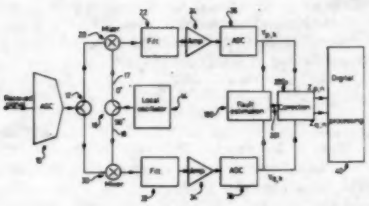
Eugène Delacroix, Vanves; Jean-Marc Fargeas, Massy Villaine, and Jean-Claude Imbeaux, Paris Cedex, all of France, assignors to ETAT FRANCAIS, representé par la Ministre des Postes, Télécommunications et de l'Espace (Centre National d'Etudes des Télécommunications), Issy les Moulineaux, France

Filed Nov. 20, 1989, Ser. No. 439,618

Claims priority, application France, Nov. 21, 1988, 88 15103

Int. Cl.[5] H03D *1/00*

U.S. Cl. 329—306 **14 Claims**



1. A demodulator for digital transmission using the technique known per se of transposing the signal to baseband and comprising separator means for operating a received HF signal into first and second identical auxiliary signals, a local oscillator providing an in-phase output signal and a quadrature output signal at 90° to its in-phase output signal, a first mixer for transposing the first auxiliary signal into an in-phase base component by multiplying it with the in-phase output signal from the local oscillator, a second mixer for transposing the second auxiliary signal into a quadrature base component by multiplying it with the quadrature output signal from the local oscillator, and respective filter and amplifier means and analog-to-digital converters connected to the outputs from each of the mixers, wherein the demodulator further includes:

estimation means suitable for estimating faults on groups of samples $Y_{p,k}$, $Y_{q,k}$ taken from the outputs of the analog-to-digital converters, faults being estimated in the form of five parameters, namely: the corrective gain α to be applied to the in-phase channel, the corrective gain β to be applied to the quadrature channel, the voltage offset a on the in-phase channel, the voltage offset b on the quadrature channel, and phase error $\delta\theta$ relative to true quadrature; and

correction means for correcting the current samples Y_p, Y_q on the basis of the parameters estimated on an earlier group of samples.

4,959,620

FREQUENCY DEMODULATION CIRCUIT

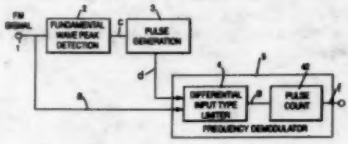
Masahiro Honjo, Neyagawa, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Sep. 18, 1989, Ser. No. 408,220

Claims priority, application Japan, Sep. 19, 1988, 63-233912

Int. Cl.[5] H03D *3/02*

U.S. Cl. 329—327 **31 Claims**



1. A frequency demodulation circuit comprising:

a peak detection circuit for detecting peaks of an input frequency-modulated signal;

a pulse generating circuit for generating, according to the detection result by the peak detection circuit, pulses respectively occurring at timings at which the peaks occur, polarities of the pulses being opposite to polarities of the respective corresponding peaks;

a differential input type limiter circuit which receives at its differential input terminals the input frequency-modulated signal and the train of pulses respectively for limiting the input frequency-modulated signal with the train of pulses as a reference signal; and

a pulse count circuit for producing a pulse having a predetermined width at each edge of pulses outputted from the differential input type limiter circuit, thereby to obtain a frequency-demodulated signal.

4,959,621

DIFFERENTIAL AMPLIFIER HAVING EXTERNALLY CONTROLLABLE POWER CONSUMPTION

Bedrich Hosticka, Duisburg; Roland Klinke, Dortmund, and Hans-Joerg Pfleiderer, Zorneding, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Jun. 16, 1989, Ser. No. 367,319

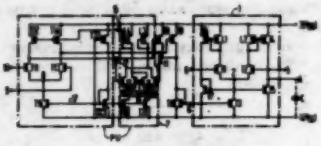
Claims priority, application Fed. Rep. of Germany, Jul. 21, 1988, 3824830

Int. Cl.[5] H03F *3/45*

U.S. Cl. 330—253 **10 Claims**

1. A differential amplifier having first and second parallel circuit branches each of which contains a load element (L1, L2) and a field effect transistor (T1, T2), respectively, and having a field effect transistor (T3) serving as a current source that is connected to both parallel circuit branches (L1, T1; L2,

T2) via a first circuit node and whose gate terminal (G) is connected to a bias that defines the quiescent currents flowing in these circuit branches, comprising a circuit stage for setting the quiescent currents that is composed of two p-channel field effect transistors (T8, T9) that are connected in parallel and that are connected in series with a resistor located in an output side of the circuit stage; the resistor located in an output side of the circuit stage connected to a gate terminal (G) of the field effect transistor (T3) that serves as current source; a level-converting circuit having an input side connected to gate terminals



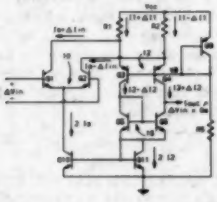
(5, 6) of the field effect transistors (T1, T2) in the parallel circuit branches, that, further, converts the DC part of the input signal to a higher output level that falls slightly below the value of the threshold voltage of the two p-channel field effect transistors (T8, T9) that are connected parallel to one another, and that has its output side connected to gate terminals of the two p-channel field effect transistors (T8, T9); and the level-converting circuit having a common-mode control circuit to which a reference voltage corresponding to the higher output level is supplied as a controlled variable.

4,959,622

OPERATIONAL AMPLIFIER WITH PRECISE BIAS CURRENT CONTROL

Mark B. Kearney, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 31, 1989, Ser. No. 401,205
Int. Cl.[5] H03F 3/45
U.S. Cl. 330—257 **5 Claims**



1. In an operational amplifier comprising a differential input stage and a separate differential to single ended output stage, and means for establishing bias currents in said input and output stages,

the improvement comprising a current mirror including an input current path and an output current path, means connecting said input current path with the combined currents in said output stage and means connecting said output current path with said input stage,

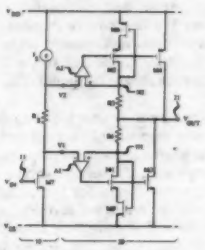
whereby the combined bias currents in said input stage are precisely controlled relative to the combined bias currents in said output stage.

4,959,623

LOW IMPEDANCE BUFFER CIRCUIT

John M. Khoury, New Providence, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 19, 1989, Ser. No. 382,162
Int. Cl.[5] H03F 3/26
U.S. Cl. 330—265 **13 Claims**



1. Amplifier circuitry including a buffer stage which comprises

(a) first and second operational amplifiers each having an output terminal and a first and a second input terminal;

(b) first and second resistance means;

(c) first and second transistor devices respectively having first and second relatively high current carrying controlled paths and respectively having first and second relatively low current carrying control terminals;

(d) first and second power rails;

(e) first connection means for connecting, from the first power rail to the second power rail, serially the first high current path of the first transistor device, the first resistance means, the second resistance means, and the second high current path of the second transistor device;

(f) second connection means for connecting a first node located between the first transistor device and the first resistance means to the second input terminal of the first operational amplifier;

(g) third connection means for connecting a second node located between the second transistor device and the second resistance means to the second input terminal of the second operational amplifier; and

(h) fourth and fifth connection means for connecting respectively the output terminal of the first operational amplifier and of the second operational amplifier to the control terminal of the first transistor device and of the second transistor device, respectively.

4,959,624

COIL-LESS OVERTONE CRYSTAL OSCILLATOR

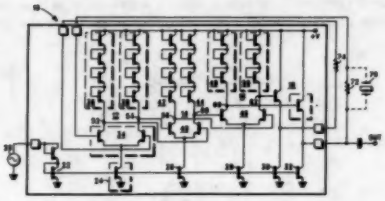
Robert J. Higgins, Jr., Sunrise, Fla.; William J. Ooms, Chandler, Ariz., and James S. Irwin, Bastrop, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Continuation of Ser. No. 358,059, May 30, 1989, abandoned. This application Apr. 9, 1990, Ser. No. 507,091
Int. Cl.[5] H03B 5/36
U.S. Cl. 331—116 R **12 Claims**

1. An oscillator circuit capable of oscillating at a resonant frequency of a resonator comprised of:

inverting amplifier means having an input and an output for amplifying and inverting a signal, said inverting amplifier means including time delay means for temporally delaying signals in said amplifier means between said input and said output of said amplifier means, a time delay provided by said time delay means and signal inversion performed by said amplifier means providing signals at at least one frequency at the output of said inverting amplifier means that are amplified from and substantially in phase with signals at said input of said amplifier means;

resonator means having at least one resonant frequency corresponding to said at least one frequency at the output of said amplifier means, for phase-shifting signals at frequencies away from said at least one resonant frequency,



said resonator means coupled between said amplifier means input and output to provide a circuit capable of oscillating at said at least one resonant frequency of said resonator means.

4,959,625

WIDE BOND BALANCED OUTPUT FREQUENCY MODULATOR USING A VIDEO SIGNAL AS A MODULATION SIGNAL

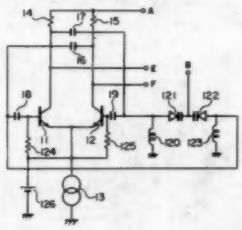
Fusahiro Kameoka, Ibaraki; Noriaki Omoto, and Toshihiro Shogaki, both of Takatsuki, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jul. 5, 1989, Ser. No. 375,418

Claims priority, application Japan, Jul. 11, 1988, 63-172121

Int. Cl.[5] H03C *3/20*

U.S. Cl. 332—135 **2 Claims**



1. A frequency modulator comprising:

first and second transistors composing a differential amplifier;

first and second load resistors inserted between respective collectors of said first and second transistors and a power supply terminal (A);

a series circuit of first and second feedback capacitors inserted between the collector of said first transistor and a base of said second transistor;

a series circuit of third and fourth feedback capacitors inserted between the collector of said second transistor and a base of said first transistor;

first and second variable capacitance diodes in which respective cathodes thereof are connected with each other and an anode of said first variable capacitance diode is connected to a junction point of said first and second feedback capacitors and an anode of said second variable capacitance diode is connected to a junction point of said third and fourth feedback capacitors;

a first resonance coil having one end thereof connected to the anode of said first variable capacitance diode and the other end thereof connected to a reference potential point; and

a second resonance coil having one end thereof connected to the anode of said second variable capacitance diode and the other end thereof connected to the reference potential point,

wherein a modulation signal is applied to the common cathode junction of said first and second variable capacitance diodes, and oscillation output signals are obtained from the respective collectors of said first and second transistors.

4,959,626

FILTER CONNECTOR WITH LOW FREQUENCY SCREENING

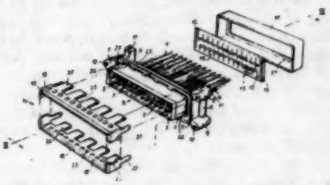
Bob Mouissie, Berlicum, Netherlands, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 2, 1989, Ser. No. 318,149

Claims priority, application Netherlands, Mar. 11, 1988, 8800609

Int. Cl.[5] H01P *13/648;* **H01R** *13/66*

U.S. Cl. 333—182 **10 Claims**



1. A filter connector comprising

an elongated body of electrically insulating material having, at each end thereof, fastening means,

a plurality of electrical contact elements of electrically conducting material disposed in said elongated body, each contact element having a contact end and a connection end,

a filter unit having a plurality of capacitor filter elements formed on a substrate of electrically insulating material, said substrate having passages formed therein for the contact elements to pass through, each filter element being associated with a corresponding passage and having a first electrode in electrical contact with a corresponding contact element passing through said corresponding passage,

a screen formed of electrically conductive material enclosing the contact elements passing through said filter unit, said screen including a first frame cover comprising two halves which when assembled around said elongated body encloses the contact ends of said contact elements, each half of said first frame cover having lips which project toward the connection ends of said contact elements past the contact ends, said lips electrically contacting corresponding second electrodes of the filter elements of said filter unit, said screen further including a second frame cover enclosing the connection ends of the contact elements, said second frame cover also electrically contacting said second electrodes of the filter elements, said first and second frame covers engaging one another so that the filter unit is confined between them.

4,959,627

ELECTROMAGNET RELAY

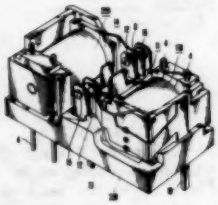
Makoto Iizumi; Tatsumi Ide; Noboru Kanzawa; Akira Sekiguchi; Masayuki Morimoto; Hitoshi Goto, and Tsutomu Ono, all of Tokyo, Japan, assignors to NEC Corporation, Japan

Filed Dec. 15, 1988, Ser. No. 284,908

Claims priority, application Japan, Dec. 23, 1987, 62-328153; Mar. 31, 1988, 63-41962; Jun. 30, 1988, 63-85875

Int. Cl.[5] H01H *67/00*

U.S. Cl. 335—106 **10 Claims**



1. An electromagnetic relay comprising:

a flat base made of an insulating material;

two flexure type electromagentic relay blocks fixed on said base so as to be point symmetrical with the center of said base and having the same structure, each of said flexure type electromagnetic relay blocks including an iron core having a coil wound therearound, a yoke fixed to one end of said iron core, an armature which opposes the other end of said iron core and is attracted to said iron core excited upon energization of said coil, a hinged spring for supporting movement of said armature, and a leaf spring having a movable contact and interlocked with said armature, a moving direction of said leaf spring being parallel to a surface of said base;

a first contact member made of a substantial U-shaped conductive member and including two make contacts respectively opposing said movable contacts of said two electromagnetic relay blocks and at least one first terminal inserted into a first through hole formed in a central portion of said base; and

a second contact member made of a substantially U-shaped conductive member and including two break contacts respectively opposing said movable contacts of said two electromagnetic relay blocks and at least one second terminal inserted into a second through hole formed in a central portion of said base;

said first and second contact members having four fixed contacts which are aligned at a center area of the base, the two make contacts of the first contact member being positioned inside the two break contacts of the second contact member;

and each of the leaf springs being moved to become closer to each other when each of the relay block is driven.

4,959,628

ROTATING ELECTRIC SWITCH ACTUATED BY FIXED MAGNETIC MEANS, USABLE FOR A SURFACE CLEANING DEVICE

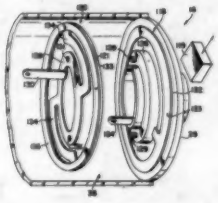
Francis W. MacGregor, Simsbury, Conn., assignor to Quad Research, Inc., Avon, Conn.

Division of Ser. No. 223,221, Jul. 22, 1988. This application Jul. 26, 1989, Ser. No. 385,673

Int. Cl.[5] H01H *36/00*

U.S. Cl. 335—205 **17 Claims**

11. A rotary electrical switch for a device having a fixed part and a rotatable part supported for rotation relative to the fixed part, said electrical switch including a pair of electrical contacts having opposed contact surfaces mounted in spaced axial relationship for rotation with the rotatable part, flexible means maintaining said spaced relationship and permitting movement of portions of said opposing contact surfaces toward each other against the bias of the flexible means, a magnetic actuator mounted on the fixed part of the device for movement toward and away from a switch actuating position, and magnetic means associated with at least one of said contacts responsive to said magnetic actuator in said actuating position to drive successive contiguous portions of the oppos-



ing contact surfaces toward each other against the bias of said flexible means and into electrical contacting engagement as the rotatable part rotates relative to the fixed part whereby to maintain portions of said contact surfaces in the region of said actuator in electrically contacting engagement with each other as the rotatable part rotates relative to the fixed part with said actuator in said actuating position.

4,959,629

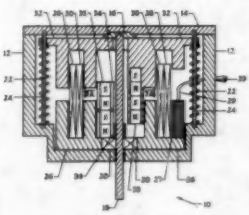
HIGH TORQUE ROTARY SOLENOID

Robert H. Luetzow, Huntington, Ind., assignor to Kearney-National, Inc., White Plains, N.Y.

Filed May 24, 1989, Ser. No. 356,119

Int. Cl.[5] H01F *7/08*

U.S. Cl. 335—228 **7 Claims**



1. A rotary solenoid comprising:

rotor means for producing rotary motion, said rotor means including a rotor member mounted on a shaft and rotor magnetic means mounted at a radius on said rotor member for producing directional magnetic flux substantially perpendicular to said shaft at a radius from said shaft;

stator means in close proximity to said rotor means for inducing a rotary force to said rotor means, said stator means including stator magnetic means for producing north polarity magnetic flux substantially perpendicular to said shaft at said radius and incident upon said rotor magnetic means in a first axial position of said stator means, said stator magnetic means also producing a south polarity magnetic flux substantially perpendicular to said shaft at said radius and incident upon said rotor magnetic means when said stator means is axially positioned in a second position;

solenoid actuator means connected to said stator means for moving said stator means from said first to said second position when said solenoid actuator means is activated; and

spring return means connected to said solenoid actuator

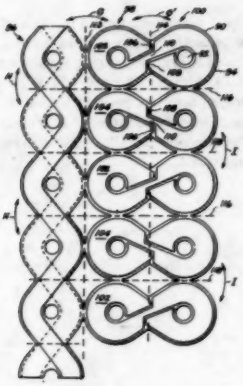
means for moving said actuator means from said second to said first position when said solenoid actuator means is deactivated.

4,959,630

HIGH-FREQUENCY TRANSFORMER

Alexander J. Yerman, Scotia, N.Y., and Khai D. Ngo, Gainesville, Fla., assignors to General Electric Company, Schenectady, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,036
Int. Cl.[5] H01F 15/02, 27/28
U.S. Cl. 336—83 34 Claims



1. A transformer, comprising:

a dielectric membrane having first and second major surfaces;

a primary winding comprising a primary conductive film disposed on each of the first and second major surfaces, respectively, of a first portion of said dielectric membrane, each said primary conductive film having a substantially serpentine configuration along a predetermined direction when disposed in a plane, said primary conductive films on the first and second major surfaces of said dielectric membrane being connected in series at one end to form said primary winding;

at least one secondary winding, each said secondary winding comprising a plurality of separate secondary conductive films electrically connected together, said secondary winding being disposed on the first major surface of a second portion of said dielectric membrane; said dielectric membrane being folded to form a stack of layers having an axis extending substantially longitudinally through said stack, said primary winding and said secondary winding each comprising a plurality of turns which encircle said axis and which are interleaved in said stock.

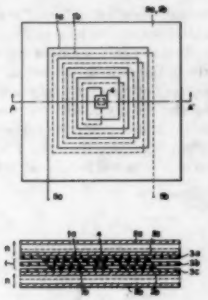
4,959,631

PLANAR INDUCTOR

Michio Hasegawa, and Masashi Sahashi, both of Yokohama, Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Sep. 28, 1988, Ser. No. 250,401
Claims priority, application Japan, Sep. 29, 1987, 62-245472; Sep. 29, 1987, 62-245473; Mar. 16, 1988, 63-62261; Mar. 16, 1988, 63-62262; Jun. 9, 1988, 63-142043; Jun. 20, 1988, 63-151779
Int. Cl.[5] H01F 15/02, 27/30
U.S. Cl. 336—83 4 Claims

1. A planar inductor comprising a laminated structure including a plurality of spiral conductor coil means sandwiched between ferromagnetic layers each including a plurality of



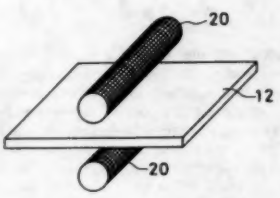
ferromagnetic ribbons, each said ferromagnetic ribbon having a thickness of 100 μm or less.

4,959,632

ORGANIC PTC THERMISTOR

Katsuyuki Uchida, Kagaokakyo, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Apr. 6, 1989, Ser. No. 334,213
Claims priority, application Japan, Apr. 6, 1988, 63-85864
Int. Cl.[5] H01C 7/00
U.S. Cl. 338—22 R 6 Claims



1. An organic PTC thermistor, comprising:

an organic PTC thermistor sheet, a surface of said organic PTC thermistor sheet being roughened by a mechanical method; and

a pair of electrodes formed on a thus roughened surface of said organic PTC thermistor sheet by means of conductive paste.

4,959,633

TEMPERATURE SENDER CONNECTOR COVER AND TERMINAL

Patrick S. Kiraly, Youngstown; John R. Metzger, Cortland, and Randall K. Smith, Fowler, all of Ohio, assignors to General Motors Corporation, Detroit, Mich.

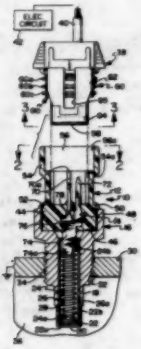
Filed Sep. 5, 1989, Ser. No. 402,297
Int. Cl.[5] H01C 7/10
U.S. Cl. 338—22 R 8 Claims

1. A temperature sender assembly including an electrically conductive shell having a tubular extension with a support surface, a thermistor element supported on the support surface, an electrically conductive compression spring located within said tubular extension having one end thereon engaged with the thermistor for completing an electrical circuit there across for sending a signal of the temperature sensed by the thermistor and electrical insulator means within the tubular extension for electrically insulating the spring from the shell and a female

connector cover connected to the shell and having a base of electrical insulation material defining a cavity for receiving a mating male connector and with an electrical terminal molded in-situ of the base the temperature sensor assembly further characterized by:

said electrical terminal configured as a flat element including a core embedded within the base of the female connector cover and a first integral segment extending from said core interiorly of the tubular extension;

connector means on said first integral segment for capturing one end of the electrically conductive compression spring and for maintaining it in compression between the female connector cover and the thermistor when the female connector cover is fastened to said electrically conductive shell;



said electrical terminal having a second integral segment thereon extending from said core in the opposite direction from said first segment and including a piloting end thereon for mating the second segment with a terminal clip on a mating connector insertable into the cavity of the female connector cover; and

said terminal element having a third integral segment thereon at a point offset with respect to said second integral segment for indexing a mating connector within said female connector cover prior to connection of the mating connector to said second integral segment; said third integral segment extending a distance above the end of said second integral segment for defining a test probe surface for probing the female connector cover for electrical continuity between the spring, thermistor and electrically conductive shell.

4,959,634

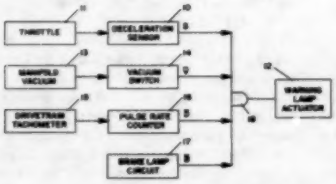
VEHICLE DECELERATION WARNING APPARATUS

Ronald L. Miller, 7300 Cascade Rd., Grand Rapids, Mich. 49508

Filed Oct. 4, 1988, Ser. No. 253,043

Int. Cl.[5] B60Q *1/26*

U.S. Cl. 340—467 **5 Claims**



1. A vehicle warning signal actuating apparatus for monitoring the operation of a vehicle and the engine thereof, said apparatus comprising:

deceleration sensor means for actuating a warning signal upon sensing the rate of vehicle deceleration that exceeds a predetermined rate;

velocity sensing means for monitoring the operating velocity of the vehicle and producing a signal which is a function thereof;

vacuum sensing means for monitoring the vehicle engine manifold pressure and producing a signal which is a function thereof;

brake monitoring means for sensing activation of the vehicle braking system and producing a signal which is a function thereof; and

a warning signal actuator coupled to each of said deceleration sensor means, velocity sensing means, vacuum sensing means and brake monitoring means and producing a warning activation signal only when the predetermined rate of deceleration has been exceeded and the velocity and manifold pressure of the vehicle are not within normal operating conditions and the vehicle braking system has not been activated.

4,959,635

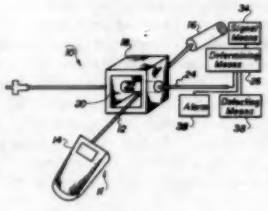
LOCK

Edwin P. Wilson, Allison Park, Pa., assignor to Minatronics Corporation, Pittsburgh, Pa.

Filed May 16, 1989, Ser. No. 352,757

Int. Cl.[5] G08B *13/14*

U.S. Cl. 340—568 **8 Claims**



1. A lock for preventing the removal of an object having a first portion with a smaller cross-sectional area than the cross-sectional area of a second portion or the cross-sectional area of a third portion between which the first portion is disposed comprising:

a housing having an opening and a removable member disposed in the opening such that when the member is removed at least the second portion or the third portion of the object can fit through the opening in the housing, but when the member is disposed in the opening, only the first portion of the object can fit therethrough; and

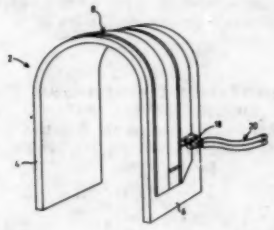
a cable which extends through the housing.

4,959,636

SEARCH HEAD FOR METAL DETECTORS

Anthony J. Maher, Vermont South, Australia, assignor to Detection Systems Pty. Ltd., Australia

Filed Dec. 15, 1988, Ser. No. 285,607
Claims priority, application Australia, Dec. 17, 1987, PI5964
Int. Cl.[5] G08B *13/14*; G01V *3/08*
U.S. Cl. 340—568 10 Claims



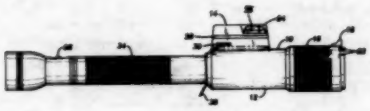
1. A search head for a metal detector, said head comprising a support body and at least one conductive loop mounted on the body characterized in that the loop is formed from ribbon cable having a plurality of conductors in a single layer.

4,959,637

EMERGENCY SIGNALING DEVICE

Richard E. Woods, Markle; Guy Bonner, Jr.; Jerry S. Smyth, both of Huntington, and Roger D. Felton, Fort Wayne, all of Ind., assignors to National Safety Devices, Inc., Fort Wayne, Ind.

Filed Aug. 7, 1989, Ser. No. 390,088
Int. Cl.[5] G08B *23/00*
U.S. Cl. 340—573 2 Claims



2. An emergency signaling device adapted to attach to a flashlight having a lamp and battery means, said device comprising:

a housing adapted to attach to the flashlight;

a control means located within said housing;

a motion detection means located within said housing and operatively connected to said control means;

an audio alarm means located within said housing and operatively connected to said control means;

a means to flash the lamp, said lamp flashing means located within the housing and operatively connected to said control means and said lamp;

a strobe light located within said and operatively connected to said control means; and

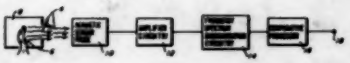
a radio frequency alarm means located within said housing and operatively connected to said control means, said battery means providing electrical power for said control means, motion detection means, audio alarm means, lamp flashing means, strobe light and radio frequency alarm means, whereby a first audio alarm is produced after a first period of no movement of the device and a second audio alarm, a flashing lamp alarm, a strobe light alarm and a radio frequency alarm are produced if there is no movement of the device for a second period of time following the first period and wherein movement of the device during a first production of the second audio alarm, flashing lamp alarm, strobe light alarm and radio frequency alarm cancels same but has no effect on any subsequent production.

4,959,638

COMBUSTION EFFICIENCY ANALYZER, ACOUSTIC

Herbert A. Palmer, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation of Ser. No. 130,503, Dec. 9, 1987, abandoned. This application Jul. 3, 1989, Ser. No. 374,710
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—577 2 Claims



1. An acoustic combustion efficiency analyzer for monitoring the combustion efficiency of a burner unit with a burner flame for optimum efficiency which comprises:

an acoustic sensor probe for providing an electrical signal from the burner flame,

an amplifier circuit interfaced with the acoustic sensor probe for processing the signal received from the acoustic sensor probe,

a frequency spectrum discrimination circuit interfaced with the amplifier circuit and a comparative processor for processing the signal received from the amplifier circuit,

a comparative processor interfaced with the frequency spectrum discriminating circuit and an output circuit for analysis of the signal by comparison with a known optimum efficiency signal, and

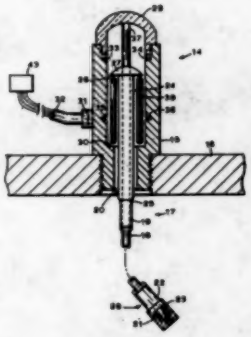
an output circuit interfaced with the comparative processor for monitoring and displaying the combustion efficiency of the burner unit.

4,959,639

FLUID DETECTING

Robert A. Benson, 13 Commonwealth Ave., Boston, Mass. 02116

Filed Mar. 27, 1989, Ser. No. 329,326
Int. Cl.[5] G08B *21/00*
U.S. Cl. 340—618 10 Claims



1. A device for detecting a fluid collected in a cavity comprising

a rod with a top and a bottom end,

a sleeve with a top and a bottom end, said sleeve being composed of a material which when exposed to said fluid loses its tensile stength,

said sleeve being fitted around said rod, and being dimensioned to slide over said rod, and said sleeve and said

rod being affixed to each other at said respective bottom ends,

biasing means engaging said rod and said sleeve for maintaining said rod in compression and said sleeve in tension,

detection means for detecting movement of the top end of said sleeve relative to the top end of said rod and for signaling after such movement occurs.

4,959,640

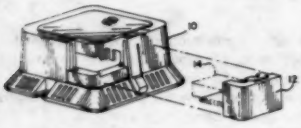
APPARATUS FOR DETECT MISSING BATTERY IN SMOKE DETECTOR

Thomas L. Hall, Port Richey, Fla., assignor to Pioneer Manufacturing, Inc., Holiday, Fla.

Filed Mar. 9, 1989, Ser. No. 320,946

Int. Cl.[5] G08B *23/00*

U.S. Cl. 340—693 **4 Claims**



1. An apparatus for providing visible indication of absence of a battery from a battery-powered smoke detector having an insertable door that holds a battery, the apparatus comprising:

a. a stop;

b. a stop spring disposed to engage the stop so as to exert a force that maintains the stop in a position that prevents insertion of the door into the smoke detector

c. means for latching a stop into a position that permits insertion of the door into the smoke detector; and

d. means for operating the means for latching upon insertion of a battery into a pair of terminals in the door.

4,959,641

DISPLAY MEANS FOR STEREOSCOPIC IMAGES

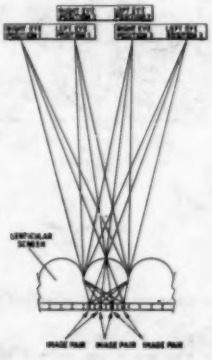
Martin L. Bass, 25 Clydeway, Rise Park, Romford, Essex Rm1 4UR, Great Britain, and Peter M. Rutherford, 9 Sumatra Road, London NW6 1PS, Great Britain

Filed Sep. 28, 1987, Ser. No. 101,925

Claims priority, application United Kingdom, Sep. 30, 1986, 8623490

Int. Cl.[5] G09G *3/36*

U.S. Cl. 340—700 **10 Claims**



1. A stereoscopic display means comprising:

a display surface;

a plurality of discrete light sources arranged on the display surface in sets, at least two light sources being arranged in a set;

means for independently controlling each light source; and

a light-transmissive lenticular screen having two or more lenticles, said screen being disposed in fixed relation to the surface so as to enable the formation of a three dimensional image, each set of light sources being adapted and arranged in registration with a respective lenticle for the display of a pair of interlaced images and said three dimensional image comprising a pair of spaced apart images having parallax therebetween.

4,959,642

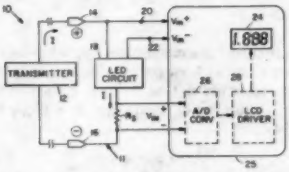
INSTRUMENTATION LOOP-POWERED BACKLIT LIQUID CRYSTAL DISPLAY

Kenneth R. Sharples, 102 Herbert St., Braintree, Mass. 02184

Filed Sep. 27, 1988, Ser. No. 249,970

Int. Cl.[5] G09G *3/18*

U.S. Cl. 340—716 **18 Claims**



1. A loop-powered, backlit liquid crystal display (LCD) for displaying a measured value comprising:

a current instrumentation loop for providing a current representative of a value to be measured;

means for measuring the current value to provide a digital signal to an LCD;

an LCD responsive to said means for measuring for displaying the measured value; and

a light emitting diode (LED) circuit including an LED disposed proximate to said LCD and interconnected with, and driven by the current of, said current instrumentation loop for backlighting said LCD.

4,959,643

DISPLAY UNIT HAVING AN IMPROVED EDITING INPUT CAPABILITY

Yasuhiro Taguchi, and Hiroichi Yoshida, both of Yamatokoriyama, Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 816,858, Jan. 7, 1986, abandoned. This application May 9, 1988, Ser. No. 191,825

Claims priority, application Japan, Jan. 31, 1985, 60-18288

Int. Cl.[5] G09G *1/00*

U.S. Cl. 340—721 **6 Claims**

1. A display unit for a word processor, comprising:

means for displaying current input data;

means for displaying recalled data;

means for dividing a reviewing screen of said display unit into a plurality of at least three display portions having a defined area when said current input data is displayed on said reviewing screen;

cursor means for controlling the location of data input on said reviewing screen of said display unit;

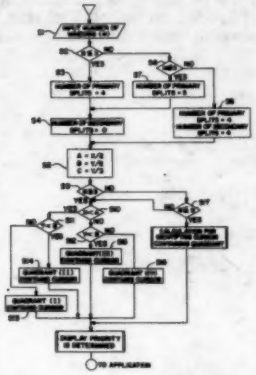
means for identifying one of said plurality of said display portions in which said cursor means is located;

means for selecting a remaining one of said plurality of display portions which does not contain said cursor means according to said means for identifying;

control means for displaying said recalled data in said selected one of said plurality of display portions, whereby

said recalled data is displayed in a display portion most remote from said cursor means; and

wherein said plurality of display portions are assigned a



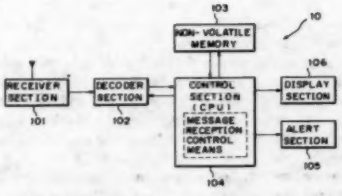
hierarchy of priorities, respectively, according to their location on said reviewing screen why with respect to said cursor means, said display portion having the highest priority being most remote from said cursor means.

4,959,644

PAGING RECEIVER WITH A DISPLAY FUNCTION THAT INHIBITS DISPLAY OF A RECEIVED COMMAND SIGNAL

Toshifumi Sato, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed Sep. 8, 1999, Ser. No. 242,063
Claims priority, application Japan, Sep. 14, 1987, 62-228276
Int. Cl.[5] H04Q *7/00*
U.S. Cl. 340—825.44 **4 Claims**



1. A paging receiver with a display function comprising:

non-volatile memory means for storing an identification in the paging receiver and for storing an operational mode of said receiver, said identification being preassigned to said receiver as its own paging signal;

receiving means for receiving and demodulating a carrier wave which has been modulated by a paging signal and a message signal which follows the paging signal and contains a message, thereby producing a demodulated paging signal, the character signals S_1 and S_2 capable of being inserted in any position in a message signal, but only when control data is necessary; all of the ordinary messages, signals s_1 and s_2, and control data having the same format;

decoding means for comparing the demodulated paging signal and a predetermined station's own paging signal and, if the demodulated and station's own paging signals are coincident, outputting the message signal which follows the paging signal;

alerting means for alerting a user of said receiver to a reception of a call, said alerting being by sound, light or similar means;

displaying means for displaying the message received; and

control means responsive to the message signal from said decoding means for controlling said alerting means and causing said displaying means to display the message;

said control means being provided with message reception control means which comprises first comparing means for comparing a predetermined first representative of the character signal S_1 character with the message contained in the message signal which is inputted from said decoding means, second comparing means for comparing the message received with a predetermined second representative of the character signal S_2 character, and switch means for extracting the received message which appears during a period beginning with an instant when said first comparing means detects the first character in the received message and ends with an instant when said second comparing means detects the second character in the received message;

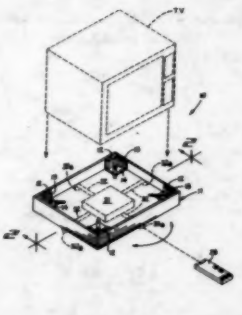
the message extracted by said message reception control means being treated as a receiver control signal which is not displayed by said displaying means.

4,959,645

REMOTELY ACTIVATED TELEVISION SWIVEL BASE

Richard C. Bolz, 301 Heath St., Buffalo, N.Y. 14214

Filed Dec. 23, 1988, Ser. No. 289,560
Int. Cl.[5] H04Q *1/00*
U.S. Cl. 340—825.72 **4 Claims**



1. A remotely actuated apparatus for effecting rotative and vertical adjustment of a television receiving unit comprising,

operator-actuatable transmitting means for producing a plurality of output signals, and

a first and second receiving means each arranged for receiving a predetermined signal from said plurality of output signals, and

a rectangular television receiving support base including an adjustable corner bracket means positionable within each corner of the support base along a support floor of the support base, and

first drive means responsive to said first receiving means for vertically adjusting the support base, and

second drive means responsive to said second receiving means for rotatably adjusting said support base, and

further including a support case underlying said support base wherein said support case includes a plurality of case braces extending outwardly of said support case, and wherein said first drive means includes a first motor drive housing fixedly secured to and extending upwardly of said

support case, and an adjustment housing vertically adjustable relative to said first motor drive housing, and

wherein said adjustment housing includes the second drive means secured thereto wherein said second drive means includes an output drive for cooperation with a driven gear wherein said driven gear is fixedly secured to the floor of said support base, and

wherein said adjustment housing includes a plurality of alignment pins extending through complementarily shaped openings extending through a floor of said support case for alignment of said adjustment housing relative to said support case, and

wherein said first motor drive housing includes a rotatable output pinion rotatably and drivingly mounted from said first motor drive housing for cooperation with a vertical rack fixedly secured to said adjustment housing for vertical positioning of said adjustment housing, and

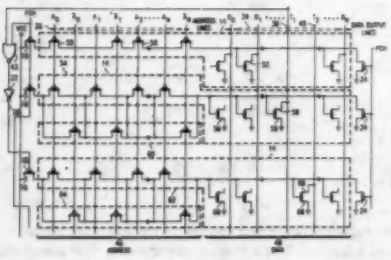
wherein said adjustable corner bracket includes a plurality of "L" shaped vertical walls with padding formed to an interior of said walls and a bracket floor extending orthogonally outwardly relative to said walls for receiving said television receiver.

4,959,646

DYNAMIC PLA TIMING CIRCUIT

William J. Podkowa, and Clark R. Williams, both of Plano, Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.

Filed Jun. 17, 1988, Ser. No. 208,891
Int. Cl.[5] H04Q *1/00*
U.S. Cl. 340—825.83 **4 Claims**



2. Timing apparatus for use in a memory device comprising:

a first dynamic PLA line having a series combination of a precharge transistor, a first address portion, and a data portion,

said data portion being connected to the gate of at least one data line transistor, said data line forming the output of said timing apparatus;

at least one additional address portion of at least one additional dynamic PLA line; and

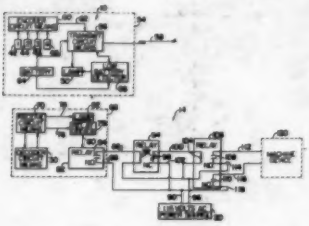
conduction means for shorting between said first address portion of said PLA line and said at least one additional address portion such that said PLA line in combination with said at least one additional address portion forms a conductive path from said precharge transistor to said data portion for any address provided to said memory device.

4,959,647

WIRELESS POWER CONTROLLER FOR A MACHINE DEVICE

Joseph Daigle, Mission Hills, Calif., assignor to Alternative Industrial Devices for Safety, Inc., Suffield, Conn.

Continuation of Ser. No. 201,043, May 31, 1988, abandoned. This application Mar. 5, 1990, Ser. No. 489,859
Int. Cl.[5] H04Q *7/02*
U.S. Cl. 340—825.720 **1 Claim**



1. A wireless power controller apparatus for use with a machine device capable of presenting some imminent danger to an operator, said controller apparatus selectively connecting and disconnecting power from the machine device in response to instructions inputted to it by a person recognizing the imminent danger to the operator of the machine, said apparatus comprising:

transmitter circuit means for transmitting an energy wave having at least one predetermined frequency, said transmitter circuit having means for generating said energy wave at said at least one predetermined frequency and means for selecting said generated energy wave whereby said selected energy wave is transmitted by said transmitter circuit means;

receiving circuit means sensitive to said at least one predetermined frequency for sensing and detecting an energy wave transmitted from said transmitter circuit means, said receiving circuit means being located at the machine device;

electrical switching circuit means connected in series with a power source supplying power to the machine device and a power ON/OFF switch associated with the machine device to selectively connect and disconnect the power source from the power ON/OFF switch, said electrical switching means being coupled to and responsive to said receiving circuit means for connecting and disconnecting the power in response to sensing the absence and presence, respectively of said at least one predetermined frequency;

said transmitter circuit means including encoder circuit means for generating a number of different predetermined frequency energy waves;

said receiving circuit means including decoding circuit means for selectively setting one of a number of different sensing frequencies, each of said number of different sensing frequencies corresponding to one of said number of different predetermined frequency energy waves transmitted by said transmitter circuit means; f

said receiving circuit means further including a receiving relay having a normally open transfer contact, said receiving relay being operated to provide a contact closure upon the sensing and detecting of said at least one predetermined frequency, said normally open contact being electrically coupled to said electrical switching circuit means;

said electrical switching circuit means further including a first relay having a normally closed transfer contact, said first relay being coupled to said receiving circuit means and being energized upon the sensing and detecting of said at least one predetermined frequency to open said nor-

mally closed contact, and a second relay having at least one normally open transfer contact, said second relay having an energizing coil connected in series with said normally closed contact of said first relay and a voltage power source for energizing said second relay when said first relay is unenergized to cause said at least one normally open contact of said second relay to provide a contact closure, said at least one normally open transfer contact being electrically connected in series with an associated voltage power line from the machine device power source and an input to the ON/OFF power switch; and

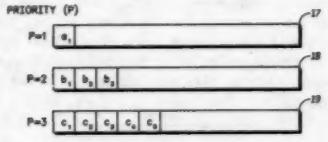
wherein said second relay includes one-four-one a normally open transfer contact in series with each voltage power line connecting the machine device power source to the ON/OFF power switch.

4,959,648

DUAL DYNAMIC PRIORITY CONTROL IN A SELCTIVE CALL SYSTEM

Robert L. Breeden; Douglas E. Griffin, and John H. Kinney, Jr., all of Boynton Beach, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Feb. 10, 1989, Ser. No. 308,711
Int. Cl.[5] H04B 7/00; H04M 11/00
U.S. Cl. 340—825.44 **11 Claims**



1. A selective call controller comprising:

means for receiving calls from call sources, for identifying the source of each call, each of said call sources having a predetermined priority;

means for transmitting said calls to call receivers, each of said call receivers having a predetermined priority; and

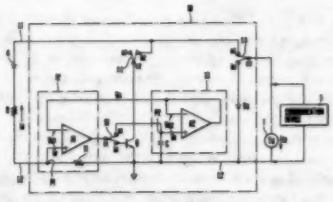
means for determining an order of transmission of the calls to the receivers as a function of the priorities of the source and the receiver for each call.

4,959,649

CURRENT HOLDING CIRCUIT OF TWO-WIRE INSTRUMENT

Shinichi Akano, Tokyo, Japan, assignor to Yamatake-Honeywell Co., Ltd., Tokyo, Japan

Filed Aug. 26, 1988, Ser. No. 237,107
Claims priority, application Japan, Sep. 3, 1987, 62-133916[U]
Int. Cl.[5] G08C 19/02
U.S. Cl. 340—870.420 **3 Claims**



1. In a two-wire instrument wherein a transmitter is coupled to a remotely located receiving resistor via a loop in order to detect a signal from said transmitter as a change in loop current, a current holding circuit for maintaining loop current at a substantially constant value when a communication device is coupled to the transmitter, said current holding circuit comprising:

means for generating a loop reference voltage, said means including a reference resistor for converting the loop current into a voltage and a first operational amplifier having a noninverting input for receiving the voltage obtained by said reference resistor, an inverting input for receiving a feedback signal, and an output for manifesting a voltage signal;

sample-hold means for hold the voltage signal output from said loop reference voltage means; and

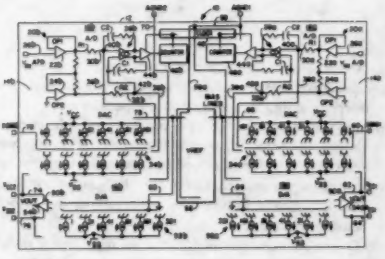
current control means for controlling the loop current through said receiving resistor on the basis of the output from said operational amplifier, thereby holding the loop current at a constant value, said current control means including an input terminal coupled to said sample-hold means and an output coupled to the inverting input of said operational amplifier for supplying said feedback signal thereto, said current control means further including a first loop forming means for forming a first loop including said receiving resistor, said reference resistor, and a first power source; and a second loop forming means for forming a second loop including said transmitter and a second power source, when the output of said first operational amplifier is disconnected from said sample-hold means, said first loop forming means being controlled by the output from said first operational amplifier, said first loop forming means including a transistor having a control input and an output, a first normally closed switch coupled between the output of said first operational amplifier and said sample-hold means, said first switch having a normally open terminal coupled to the control input of said transistor, and a second normally open switch coupled between the output of said transistor and said first power source, said first switch normally connecting the output of said first operational amplifier to an input side of said sample-hold means, and when said communication device is used, said first switch connecting the output of said first operational amplifier to the control input of said transistor, and said second switch being closed to connect said transistor output to said first power source to form said first loop.

4,959,650

DUAL CHANNEL A/D AND D/A CONVERTER WITH IMPROVED ISOLATIONS

Miki Moyal, Austin, Tex., assignor to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Jul. 3, 1989, Ser. No. 375,082
Int. Cl.[5] H03M 1/00
U.S. Cl. 341—126 **20 Claims**



1. A dual channel A/D and D/A converter comprising:

first channel means formed on a single semiconductor substrate for converting between analog signals and digital signals;

second channel means formed on said semi-conductor substrate at a predetermined distance from said first channel means for converting between analog signals and digital signals;

reference generator means formed on said semiconductor substrate and disposed intermediate said first channel converter and said second channel converter for functioning as a distance barrier therebetween;

clock logic means formed on said semi-conductor substrate for generating clock signals on clock connection means;

first ground connection means coupled to said first channel means defining a quiet ground bus line and which is disposed around said reference generator means to provide isolation from said clock signals;

second ground connection means coupled to said second channel means and being separated from said first ground connection means; and

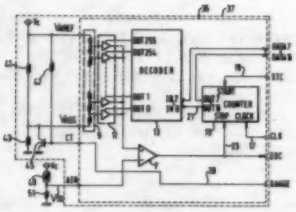
barrier means formed around said quiet ground bus line and said reference generator means to provide further isolation of said first and second channel means from said clock signals.

4,959,651

TEMPERATURE DETECTION METHOD AND APPARATUS

Tetsuro Yamada, Ibaraki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jun. 1, 1988, Ser. No. 200,893
Claims priority, application Japan, Aug. 5, 1987, 62-195899
Int. Cl.[5] H03M *1/20*
U.S. Cl. 341—131 **9 Claims**



1. A temperature detector comprising:

temperature sensing means for generating an analog voltage corresponding to a detected temperature;

means for selecting one of a plurality of reference voltage ranges, the selecting means including switching means for selecting a reference voltage range which includes an analog voltage generated by the temperature sensing means when a failure has occurred in the temperature sensing means; and

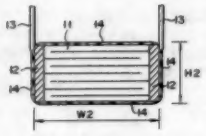
A/D conversion means for outputting digital data corresponding to the analog voltage from the temperature sensing means by comparing the analog voltage with the reference voltage range selected by the selecting means.

4,959,652

METALIZED FILM CAPACITOR AND METHOD OF MANUFACTURING THE SAME

Eiichi Hirama, Nagai, Japan, assignor to Marcon Electronics Company, Ltd., Nagai, Japan

Filed Aug. 30, 1989, Ser. No. 400,874
Claims priority, application Japan, Sep. 2, 1988, 63-116248[U]
Int. Cl.[5] H01G *1/14, 7/00*
U.S. Cl. 361—310 **12 Claims**



1. A metalized film capacitor comprising:

a capacitor element obtained by winding or stacking metalized films;

porous conductive layers respectively formed on outermost layers on both end faces of said capacitor element and made of a metal having a melting point higher than a surface-mounting heating temperature; and

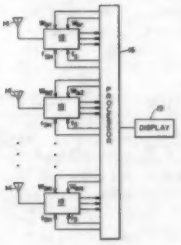
a coating resin which coats said capacitor element and a part of which is impregnated into said porous conductive layers, said coating resin being removed to expose said conductive layers including the resin, thereby constituting exposed portions as a pair electrodes of the capacitor element.

4,959,653

ADAPTIVE SIDELOBE BLANKER

Matthew W. Ganz, Chelmsford, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.

Filed Aug. 23, 1989, Ser. No. 397,658
Int. Cl.[5] G01S *3/80*
U.S. Cl. 342—17 **12 Claims**



1. A method of detecting radar signals comprising:

providing an antenna array;

generating an interference representation of interference signals received through the antenna array;

transmitting a radar signal and receiving through each antenna of the antenna array a reflected signal;

generating an adaptively nulled representation of the reflected signal by weighting the received signals by a first weighting matrix which defines a main beam pattern with at least one dominant lobe, modified by the interference representation;

generating a blanking signal by weighting the received signals by a second weighting matrix which defines a gener-

ally omnidirectional antenna pattern modified by the interference representation; and

providing a radar display of the adaptively nulled representation blanked by the blanking signal.

4,959,654

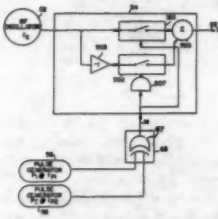
DIGITALLY GENERATED TWO CARRIER PHASE CODED SIGNAL SOURCE

Merlin D. Bjorke, Hennepin, and Baard H. Thue, Anoka, both of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 40,036, Apr. 20, 1987, Pat. No. 4,851,852, which is a continuation-in-part of Ser. No. 713,118, Mar. 18, 1985, abandoned. This application Sep. 7, 1988, Ser. No. 241,688

Int. Cl.[5] G01S *13/08*; H04L *27/20*

U.S. Cl. 342—120 **7 Claims**



4. A signal generator for generating an RF signal comprised of two phase related frequency components, said signal generator comprising:

a high frequency oscillator for generating a first RF signal;

first and second phase related pulse generators for generating first and second pulse train signals having a first and a second repetition frequency, respectively;

first means responsive to said first and second pulse train signals for providing a product signal representative of the product of said first and second pulse train signals; and

a controllable bi-phase modulating switch having input means connected to the output of said high frequency ocsillator, and an output means, said switch including control means for receiving said product signal, said switch means operative to pass said first RF signal to said output means in response to a first condition of said first product signal, and passing said first RF signal to said output means with 180° phase inversion in response to a second condition of said product signal.

4,959,655

METHOD FOR THE RADIOLOCATION OF A VEHICLE CARRYING A RECEIVING DEVICE, BY MEASURING THE DIFFERENCES BETWEEN THE TIMES FOR RECEIVING RADIO-FREQUENCY SIGNALS, AND RECEIVING DEVICE FOR CARRYING OUT THIS METHOD

Christian J. Lamiraux, Sebastien Sur Loire, France, assignor to MLR Electronique, Vallet, France

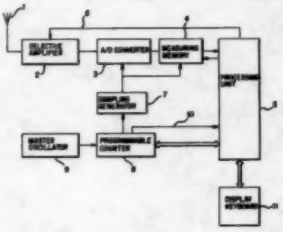
Filed Jul. 6, 1988, Ser. No. 215,819

Claims priority, application France, Jul. 6, 1987, 87 09556

Int. Cl.[5] G01S *1/24*; G01C *21/00*

U.S. Cl. 342—389 **7 Claims**

1. A method for the radiolocation of a vehicle carrying a receiving device, by measuring the differences between the times of receiving radiofrequency signals transmitted by two pairs of transmitting stations geographically separated from each other, one pair of transmitting stations from a first group of stations and the second pair of transmitting stations from a second group of stations, each group comprising at least two transmitting stations including one master transmitter station and at least one slave transmitter station which is controlled by the master transmitter, each station of the two pairs of transmitting stations transmitting a series of electric pulses which is time-shifted in a predetermined way with respect to the series of pulses transmitted by the other stations of the two pairs of stations in a way to avoid simultaneous reception of said series of electric pulses coming from different stations, during a predetermined period of time specific for each group, the periods of specific time for each group being different from the ones of the other group, wherein an acquisition of the signals and a measurement of the difference between the times for



receiving the signals transmitted by transmitting stations of two different groups are performed in a unique receiving channel by performing the acquisitions and measurements of the signals transmitted by stations of the first group during the predetermined period of time specific for the first group and by performing the acquistions and measurements of the signals of the transmitting stations of the second group during the interval of time which has been left available by the acquisition and the measurement of the signals from the first group, during the period specific for the first group.

4,959,656

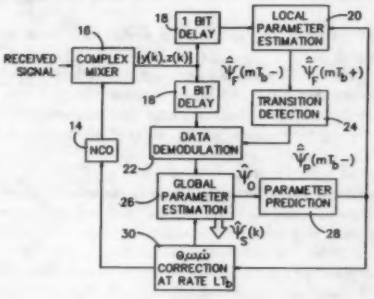
EFFICIENT DETECTION AND SIGNAL PARAMETER ESTIMATION WITH APPLICATION TO HIGH DYNAMIC GPS RECEIVER

Rajendra Kumar, Cerritos, Calif., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed Oct. 31, 1989, Ser. No. 429,734

Int. Cl.[5] G01S *5/02*; H04B *7/185*; H04L *27/22*

U.S. Cl. 342—418 **16 Claims**



4. In a system for deriving position, velocity, and acceleration information from a received signal emitted from an object to be tracked wherein the signal comprises a carrier signal phase modulated by unknown binary data and experiencing very high Doppler and Doppler rate, the method of providing the parameters associated with the signal from which the

position, velocity, and acceleration information can be derived comprising the steps of:

(a) first estimating the received signal local (data dependent) parameters over two consecutive bit periods;

(b) detecting a possible jump in the parameters signifying a data transition;

(c) removing detected data transitions from the received signal to create an effectively demodulated signal; and,

(d) processing the effectively demodulated signal to provide estimates of global (data independent) parameters of the signal related to position, velocity, and acceleration of the object.

4,959,657

OMNIDIRECTIONAL ANTENNA ASSEMBLY

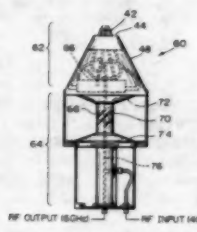
Akio Mochizuki, Tokyo, Japan, assignor to NEC Corporation, Japan

Continuation of Ser. No. 70,259, Jul. 6, 1987, abandoned. This application Mar. 8, 1989, Ser. No. 320,467

Claims priority, application Japan, Jul. 4, 1986, 61-157421

Int. Cl.[5] **H01Q** *21/29*

U.S. Cl. 343—725 **6 Claims**



1. An omnidirectional antenna assembly comprising a four-element whip antenna, said four-element whip antenna including:

a first reflector having an outer perimeter which is disk shaped;

four whip elements mounted on said first reflector in such a manner that said four whip elements are located on a first side of said first reflector where said whip elements receive electromagnetic waves reflected by said first reflector;

a second reflector; and

a frustroconical reflector having a frustroconical shape for interconnecting said first reflector and said second reflector such that said frustroconical reflector is located on a second side of said first reflector and is coupled to and flares away from said outer perimeter of said first reflector and such that said second reflector is connected to an end of said frustroconical reflector that is opposite to said first reflector;

the orientation of said first reflector, said frustroconical reflector, said second reflector and said four whip elements being such that electromagnetic waves radiated from said four whip elements reach behind said four-element whip antenna.

4,959,658

FLAT PHASED ARRAY ANTENNA

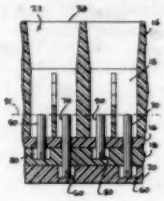
John L. Collins, 3 Cupar Road, Largoward, Leven, Fife KY9 1HX, Scotland

Filed Aug. 12, 1987, Ser. No. 84,664

Claims priority, application United Kingdom, Aug. 13, 1986, 8619680

Int. Cl.[5] **H01Q** *13/02*

U.S. Cl. 343—786 **17 Claims**



1. In an antenna, a waveguide system comprising:

a first substantially planar layer having first and second surfaces; first channels defined along said first surface and recessed within said first layer;

a first conductive network disposed in said first channels;

a second layer having a substantially planar third surface, said second layer being adjacent said first layer with said third surface of said second layer in intimate contact with said first surface, said third surface of said second layer providing a closure surface for closing said first channels;

support means originating within said first channels for supporting said first conductive network in spaced relation from the interior surface of said closed first channels;

an energy reflecting metallic coating surrounding the interior surfaces of said closed first channels, said metallically coated interior surfaces of said channels defining waveguide means for said first conductive network;

a conductive portion formed as part of said network, said conductive portion projecting outwardly from said first channels;

a third substantially planar layer having fourth and fifth surfaces;

second channels defined along said fourth surface and recessed within said third layer;

a second conductive network disposed in said second channels;

said second surface of said first layer being in intimate contact with said fourth surface of said third layer, said second surface providing a closure surface for closing said second channels; and

a metallic coating surrounding the interior surfaces of said closed second channels, said metallically coated interior surfaces of said second channels defining waveguide means for said second conductive network.

4,959,659

COLOR PICTURE FORMING APPARATUS AND METHOD

Takashi Sasaki, Tokyo; Nobuaki Sakurada, Yokohama, and Hideaki Kawamura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Japan

Continuation of Ser. No. 896,320, Aug. 13, 1986, abandoned, which is a continuation of Ser. No. 585,303, Mar. 1, 1984, abandoned. This application Jun. 27, 1988, Ser. No. 212,097

Claims priority, application Japan, Mar. 8, 1983, 58-37698; Apr. 28, 1983, 58-75857

Int. Cl.[5] **E01D** *15/16;* **H04N** *1/46*

U.S. Cl. 346—1.1 **69 Claims**

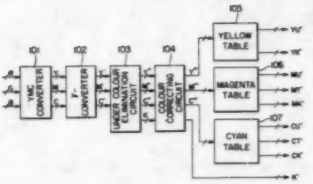
42. A color picture forming apparatus comprising:

magenta dot forming means for depositing magenta dots of

different sizes using a plurality of recording materials which have N_M different concentrations in order to enable representation of substantially all of the optical density gradations of the magenta components of the color picture;

cyan dot forming means for depositing cyan dots of different sizes using a plurality of recording materials which have N_C different concentrations in order to enable representation of substantially all of the optical density gradations of the cyan components of the color picture;

yellow dot forming means for depositing yellow dots of



different sizes using a plurality of recording materials which have a plurality of N_Y different concentrations in order to enable representation of substantially all of the optical density gradations of the yellow components of the color picture;

signal generating means for generating recording color signals of magenta, cyan and yellow; and

control means for controlling the dot size and recording material concentration provided by each of said dot forming means according to each of the recording color signals,

wherein the relation among N_M, N_C and N_Y is N_M, $N_C > N_Y$.

4,959,660

INK JET IMAGE FORMATION APPARATUS WITH MEANS FOR COLLECTING INK MIST

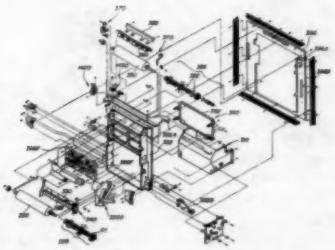
Tetsuo Suzuki, Kawasaki; Makoto Takemura, Tokyo, and Shigeru Yoshimura, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 27,617, Mar. 18, 1987, abandoned. This application Mar. 1, 1989, Ser. No. 319,878

Claims priority, application Japan, Mar. 20, 1986, 61-062471

Int. Cl.[5] B41J 2/17

U.S. Cl. 346—1.1 **21 Claims**



1. A method of collecting fine liquid droplets in an image forming apparatus, comprising the steps of:

recording images on a recording medium in a recording area by ejecting liquid from recording means through a space and onto a recording medium;

generating a suction airflow by a fan provided to draw the recording medium against a platen to form a recording surface in the apparatus, with the air flow containing fine liquid droplets entrained therein;

collecting the fine liquid droplets into a collecting member having a suction portion disposed proximate to the recording surface for the airflow having fine liquid droplets entrained therein, the suction portion being disposed at a side of the recording area, outside of the space and on the opposite side of the recording surface from the recording means and having a length corresponding to the length of the recording area in the conveyance direction of the recording medium; and

absorbing the entrained fine liquid droplets in an absorbing member.

4,959,661

INK-JET PRINTING PROCESS

Galina P. Buxton, Tenafly, and Harshad M. Shah, Fairlawn, both of N.J., assignors to Olin Hunt Specialty Products Inc., Cheshire, Conn.

Filed Sep. 28, 1989, Ser. No. 413,898

Int. Cl.[5] B41J 2/01; C09D 11/00

U.S. Cl. 346—1.1 **13 Claims**

1. A process for applying an ink-jet printing ink comprising the steps of:

(a) preparing an aqueous Newtonian dispersion containing:

(1) about 0.01% to about 5.0% by weight, based on the weight of the dispersion of particulate materials selected from the group consisting of an acidic or neutral carbon black and pigments, said particulate material, having an average particle size of less than about 3.0 microns in said dispersion;

(2) an effective dispersing amount of an anionic, cationic, or nonionic surfactant which is compatible with said carbon black or pigment; and said dispersion having a surface tension of greater than 35 mN/m and a viscosity in the range of 1–10 mNS/m^2 and a pH of 8 to 11;

(b) removing all aggregates larger than 5 microns; and

(c) ink-jet printing said dispersion onto a receptor substrate.

4,959,662

INK JET RECORDER HAVING MEANS FOR REMOVING UNUSED INK FROM INK DISCHARGE ORIFICE AND FOR CAPPING SAME

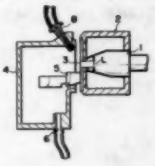
Tohru Kobayashi, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 60,474, Jun. 11, 1987, abandoned. This application Mar. 24, 1989, Ser. No. 327,428

Claims priority, application Japan, Jun. 13, 1986, 61-136165

Int. Cl.[5] B41J 2/165

U.S. Cl. 346—1.1 **8 Claims**



1. A method for recovering unused ink from an ink jet recording head during a recovery process, said method comprising the steps of:

providing an ink jet recording head having an orifice for discharging ink therefrom;

ejecting ink from said orifice during said recovery process;

jetting gas from above said orifice toward said orifice to blow ink ejected therefrom downwardly during said recovery process; and

collecting ink ejected from said orifice and blown down-

wardly therefrom by said jetted gas using an ink absorbing member disposed below said orifice and in abutment with a surface adjacent said orifice, wherein said ejecting and jetting steps are performed substantially at the same time.

4,959,663

IMAGE RECORDING DEVICE

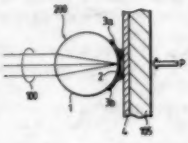
Kazuhiro Chiba, and Noriko Bamba, both of Kyoto, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 28, 1989, Ser. No. 317,284

Claims priority, application Japan, Feb. 29, 1988, 63-47333; Apr. 11, 1988, 63-88527

Int. Cl.[5] G01D *15/10*; G03G *5/16*

U.S. Cl. 346—76 PH **1 Claim**



1. An image printing device using a laser beam, comprising:

a head including a support transmitting a laser beam, a film resistor which reacts upon temperature or light quantity and electrodes for applying voltage to said film resistor; and

means for generating a laser beam for controlling the generation of heat by said film resistor, in which

the optical intensity of said laser beam is modulated according to an image signal,

said laser beam thus modulated is converged so as to have a predetermined beam diameter and deflected in a scanning mode at a predetermined speed,

said laser beam thus converged is applied spot-wise to said film resistor, to reduce the resistance thereof, and

said resistance thus reduced cooperating with a voltage applied to said film resistor generates heat spot-wise in said film resistor, for monochromatic image printing operation or a color image printing operation.

4,959,664

LASER SCANNER WITH BEAM TRANSMISSIVITY CONTROL

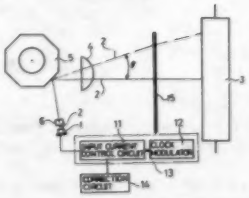
Toshio Naiki, and Muneo Kuroda, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Aug. 26, 1988, Ser. No. 237,294

Claims priority, application Japan, Aug. 27, 1987, 62-213739

Int. Cl.[5] G01D *15/14*; A04N *1/40*

U.S. Cl. 346—108 **19 Claims**



19. In an improved scanning optical system for use in a laser beam printer having a laser beam generating means for providing a laser beam that can be modulated with printing information and means for scanning the laser beam across a recording surface from a central on axis position to respective peripheral portions of the recording surface with a resulting variance in angle of the laser beam from the central on axis position, the improvement comprising:

an optically transmissive member mounted in a scanning path of the laser beam before the recording surface and having a coating layer, an index of refraction and optical thickness of predetermined values, extending across the scanning path to lessen the angle of transmission of the incident laser beam relative to any corresponding increase in angle of incident on the coating layer to insure a relatively even transmission of the laser beam across the scan path to the recording member.

4,959,665

LASER PRINTER WITH HARMONIC WAVE SEPARATION OF THE BEAM

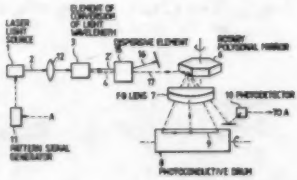
Susumu Saito, Hachiouji, and Akira Arimoto, Kodaira, both of Japan, assignors to Hitachi Koki Co., Ltd. and Hitachi, Ltd., both of Tokyo, Japan

Filed Aug. 15, 1989, Ser. No. 393,888

Claims priority, application Japan, Sep. 9, 1988, 63-224673

Int. Cl.[5] G01D *9/00, 15/14*; H01S *3/10*

U.S. Cl. 346—108 **15 Claims**



1. An information device using laser light, comprising:

a laser light source;

a conversion element for converting laser fundamental wave light irradiated from said laser light source into harmonic wave light;

a photo-receptor for receiving laser light passing through said conversion element; and

a dispersive element which is provided in an optical path between said conversion element and said photo-receptor and separates an optical path of the fundamental wave light remaining in said laser light passing through said conversion element from an optical path of the harmonic wave light so as to allow the harmonic wave light to reach said photo-receptor but not to allow the fundamental wave light to reach said photo-receptor.

4,959,666

IMAGE FORMING APPARATUS HAVING A PLATEN AND RECORDING MEANS ELASTICALLY PRESSED TOGETHER

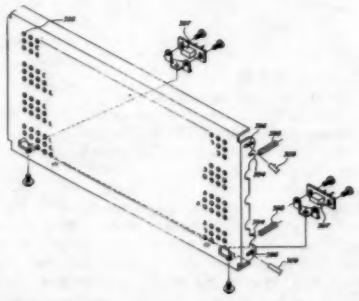
Shigeru Yoshimura; Tetsuo Suzuki, both of Kanagawa, and Makoto Takemura, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 310,009, Feb. 9, 1989, abandoned, which is a continuation of Ser. No. 49,168, May 13, 1987, abandoned, which is a division of Ser. No. 844,132, Mar. 26, 1986, Pat. No. 4,692,778. This application Oct. 19, 1989, Ser. No. 423,747

Claims priority, application Japan, Mar. 25, 1985, 60-65106; Mar. 28, 1985, 60-65103; Mar. 28, 1985, 60-65108; Mar. 28, 1985, 60-65112; Mar. 28, 1985, 60-65114; Mar. 28, 1985, 60-65116; Mar. 28, 1985, 60-65117; Mar. 28, 1985, 60-65118; Mar. 28, 1985, 60-65119; Mar. 28, 1985, 60-65120; Mar. 28, 1985, 60-65121

Int. Cl.[5] B41J *2/01, 11/20*

U.S. Cl. 346—136 14 Claims



1. An image forming apparatus comprising:

a platen for contacting and holding a rear surface of a recording medium, said platen having a recording surface area and at least three positioning areas;

recording means for recording on said recording medium by discharging a liquid, said recording means having at least three positioning portions corresponding to said positioning areas; and

pressing means for elastically pressing said positioning areas against said positioning portions, wherein said positioning areas and said positioning portions are provided at both sides of said recording medium across said platen relative to a conveyance direction of said recording medium, wherein each said positioning area contacts a corresponding positioning portion to form a gap between said recording means and said recording medium, and said pressing means maintains simultaneous contact between at least three of said positioning areas and corresponding ones of said positioning portions.

4,959,667

REFILLABLE INK BAG

George Kaplinsky, San Diego, Calif., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Feb. 14, 1989, Ser. No. 311,505

Int. Cl.[5] B41J *2/175, 2/05*

U.S. Cl. 346—140 R 7 Claims

1. An ink delivery system (1) for a printer comprising:

(a) an ink supply bag(3);

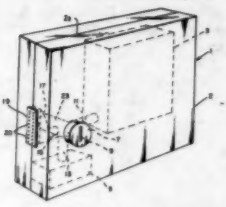
(b) an ink regulating bag (5);

(c) a print head (19);

(d) a three way valve (7) comprising a rotatable stem having an angled channel therein;

(e) means (11,13) for supplying ink from said ink supply bag to said ink regulating bag through said angled channel in said three way valve;

(f) means (13, 15) for supplying ink from said ink regulating bag to a print head through said angled channel in said three way valve;



(g) means (7) for selectively rotating said stem to shut off the flow of ink from the ink supply to the ink regulating bag of from the ink regulating bag to the print head for both; the ink regulating bag being positioned at a level lower than the print head.

4,959,668

DEVICE FOR PRODUCING IMAGES ON PRINTING IMAGE CARRIERS

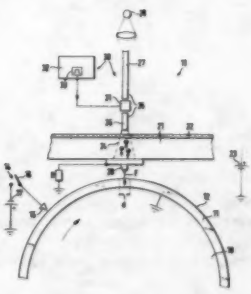
Alfred Hirt, München, Fed. Rep. of Germany, assignor to MAN Technologie GmbH, München, Fed. Rep. of Germany

Filed Nov. 2, 1988, Ser. No. 266,167

Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740079

Int. Cl.[5] G01N *15/00*

U.S. Cl. 346—155 25 Claims



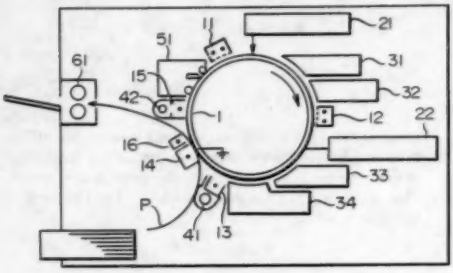
1. An electric image producing device for use in conjunction with a printing image carrier of a printing press comprising at least one writing unit, in the form of an electrode means, for modifying said printing image carrier in a local and punctuate manner, said at least one writing unit being adapted to be connected with an electrical power supply and including means for driving it in accordance with an image on said printing image carrier, said printing image carrier being able to be modified electrochemically and said writing unit comprising a control electrode and a field forming intermediate electrode, which are same being at partly immersed in an electrolyte.

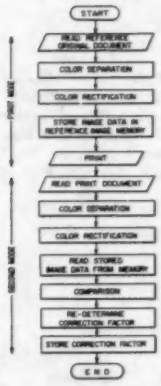
4,959,669

COLOR CORRECTION DEVICE FOR A COLOR IMAGE FORMING APPARATUS

Satoshi Haneda; Hisashi Shoji, both of Hachioji, and Kunihisa Yoshino, Mitaka, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Jun. 2, 1988, Ser. No. 201,206
Claims priority, application Japan, Jun. 3, 1987, 62-140414
Int. Cl.[5] G03G *15/01*; G01D *15/06*
U.S. Cl. 346—157 4 Claims





1. A color image processing apparatus comprising;

image-reading means for reading a color image on an original to obtain first color image data;

a factor memory for storing a predetermined correction factor;

correction means for correcting the first color image data with the correction factor;

an image memory for storing the corrected first color image data;

image-producing means for producing a color copy image on the basis of the corrected first color image data, the image-reading means being adapted to read the color copy image to obtain second color image data and the correction means being adapted to correct the second color image data with the correction factor; and

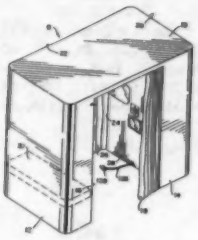
processing means for performing a comparison of the corrected first color image data stored in the image memory and the corrected second color image data, and changing the correction factor on the basis of the comparison.

4,959,670

PHOTOGRAPHY BOOTH AND METHOD

Donald O. Thayer, Jr., 153 Lincoln St., Garden City, N.Y. 11530

Division of Ser. No. 253,652, Oct. 5, 1988, Pat. No. 4,896,175, which is a continuation-in-part of Ser. No. 932,365, Nov. 19, 1986, Pat. No. 4,804,983. This application Dec. 11, 1989, Ser. No. 448,265
Int. Cl.[5] G03B *15/06, 29/00*
U.S. Cl. 354—76 13 Claims



1. A photography booth, comprising:

(a) an enclosure including first and second spaced walls;

(b) opening means disposed in said first wall;

(c) a photographic camera in alignment with said opening means for perceiving said second wall;

(d) a video camera;

(e) means operably associating said photographic and video cameras for causing the image perceived by said photographic camera to be directed to said video camera;

(f) video display means in alignment with said opening means, said video display means being operably associated with said video camera so that the image perceived by said photographic camera is displayed thereon and directed toward said second wall;

(g) means operably associated with said photographic camera for causing a length of film therein to be exposed;

(h) platform means pivotally associated with said first wall;

(i) said photographic and video cameras being mounted to said platform means; and,

(j) means operably associated with said platform means for causing pivoting thereof.

4,959,671

VERTICAL TILTING APPARATUS OF TRIPOD HEAD

Masao Ishikawa, Yashio, Japan, assignor to Heiwa Seiki Kogyo Co., Ltd., Yashio, Japan

Filed Feb. 9, 1989, Ser. No. 308,085
Int. Cl.[5] G03B *29/00*
U.S. Cl. 354—81 4 Claims

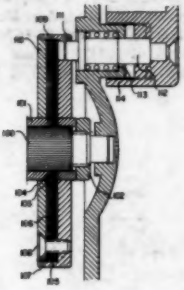
1. A torque changeover mechanism for a vertical tilting apparatus of a tripod head which incorporates a securing disk that maintains the horizontal state of a camera mounted thereon in balance with elastic bodies acting in opposition to each other at right and left ends of a horizontal shaft in the vertical tilting apparatus, said torque changeover mechanism comprising:

a first unit incorporating the horizontal shaft and having a plurality of first damp adjusting plates and first intermediate bodies wherein the first change adjusting plates and the first intermediate bodies are concentrically and alternatingly arranged with each other along the longitudinal axis of the shaft, the first damp adjusting plates and the first intermediate bodies being securely fit with the shaft;

a second unit having ring-shaped second intermediate bodies and second damp adjusting plates wherein the second intermediate bodies and second damp adjusting plates are concentrically and alternatingly arranged with each other relative to the longitudinal axis of the shaft, said first unit

being inter-engaged with said second unit such that each first damp adjusting plate is co-axially positioned with a corresponding second intermediate body along a first plane and each first intermediate body is co-axially positioned with a corresponding second damp adjusting plate along a second plane;

a unit case for holding and sealing therein said inter-engaged first and second units, said second unit being securely fit in



said unit case and said unit case having a plurality of securing holes defined along a radius on a surface of said unit case;

a unit securing pin releasably insertable into any of the securing holes on said unit case for securing said first and second units to allow torque balance adjustment; and

viscous fluid filled into said unit case and between said inter-engaged first and second units.

4,959,672

MOTOR-DRIVEN FILM WINDER

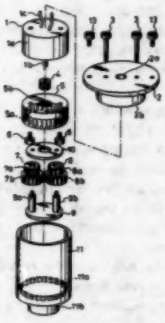
Tsunemi Yoshino, Nara; Naoyuki Furutsuka, Kawabe; Naofumi Aoki, Takatsuki; Hiroshi Watanabe, Suita, and Akitoshi Morioka, Kitakatsuragi, all of Japan, assignors to West Electric Company, Ltd., Osaka, Japan

Filed Oct. 16, 1989, Ser. No. 421,461

Claims priority, application Japan, Oct. 17, 1988, 63-260836

Int. Cl.[5] G03B *1/18*

U.S. Cl. 354—173.1 **2 Claims**



1. A motor-driven film winder comprising:

a spool having a hollow cylindrical shape, which is rotatably arranged within a body frame of a camera;

a motor which is arranged in said spool, and which is fixed to said body frame of said camera;

a pinion gear which is fixed to a output shaft of said motor;

an internal gear which is fixed to said motor;

at least one planet gear having a stepped shape, which comprises a first gear to mesh with both of said pinion gear and an internal gear portion of said internal gear, and a second gear having larger diameter than said first gear; and

an internal gear 11*a* which is provided on an internal circumference face of said spool to mesh with said second gear.

4,959,673

INK JET RECORDING APPARATUS

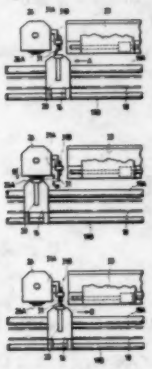
Atsushi Noda, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 291,763, Dec. 29, 1988, abandoned. This application Oct. 10, 1989, Ser. No. 418,960

Claims priority, application Japan, Dec. 29, 1987, 62-335367

Int. Cl.[5] G01D *15/18*

U.S. Cl. 346—140 R **32 Claims**



1. An ink jet recording apparatus comprising a recording head having a surface in which is provided a discharge port for discharging ink therethrough and cleaning means with a cleaning member capable of contacting said surface, in which cleaning of said surface is performed by the relative movement of said cleaning member and said recording head,

wherein said cleaning means includes changing means for changing a cleaning force of said cleaning member against said surface in response to a direction of said relative movement when cleaning is performed.

4,959,674

ACOUSTIC INK PRINTHEAD HAVING REFLECTION COATING FOR IMPROVED INK DROP EJECTION CONTROL

Butrus T. Khri-Yakub; Scott A. Elrod, both of Palo Alto, and Calvin F. Quate, Stanford, all of Calif., assignors to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1989, Ser. No. 416,796

Int. Cl.[5] B41V *2/04*

U.S. Cl. 346—140 R **14 Claims**

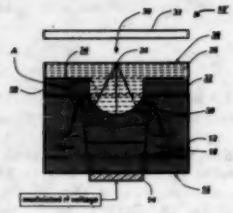
1. An acoustic printhead for ejecting droplets of liquid on demand from a free surface of a liquid pool, comprising:

a solid substrate having first and second surfaces, and having an acoustic focussing element formed therein;

acoustic wave generating means intimately coupled to said second surface of said substrate for generating rf acoustic waves to illuminate said lens such that said lens launches converging acoustic beams into said liquid; and

acoustically reflective means intimately coupled to and substantially entirely coating said first surface of said substrate except in the region proximate said acoustic lens

such as to define an opening corresponding to the position and size of said acoustic lens, for inhibiting extraneous



acoustic energy from coupling into the liquid pool other than through said lens.

4,959,675

DEVICE FOR ADJUSTING CAMERA IN THE INITIAL STAGE

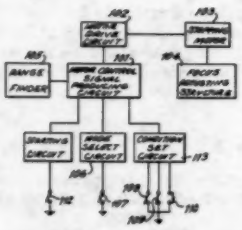
Yoichi Seki, and Kazuo Akimoto, both of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jun. 8, 1989, Ser. No. 363,039

Claims priority, application Japan, Jun. 8, 1988, 63-140795

Int. Cl.[5] G03B *13/00*

U.S. Cl. 354—400 **20 Claims**



1. A device for initially adjusting an adjustable structure means, said adjustable structure means adjusting the lens or opening and closing sectors of a camera in response to variable criteria related to the subject matter to be photographed by said camera comprising:

motor means moving said adjustable structure means;

motor control means connected to said motor means for controlling the rotation of said motor means;

measuring means connected to said motor control means for measuring said variable criteria and outputting a measure signal to said motor control means; and

measured signal compensating means connected to said motor control means and outputting an adjustment signal to said motor control means to correct said measured signal.

4,959,676

CONTROL DEVICE FOR USE IN A CAMERA HAVING AN OBJECTIVE LENS

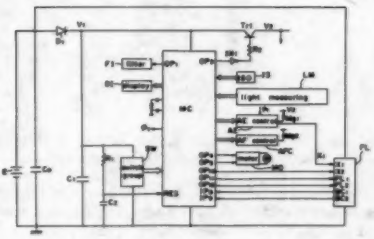
Motonobe Matsuda, Kawachinagano; Yoshihiro Tanaka, Osaka; Motohiro Nakanishi, Kobe; Nobuyuki Taniguchi, Nishinomiya, and Hiroshi Ootsuka, Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 267,550, Nov. 7, 1988, abandoned, which is a division of Ser. No. 43,616, Apr. 28, 1987, Pat. No. 4,800,409. This application Dec. 4, 1989, Ser. No. 443,841

Claims priority, application Japan, Apr. 28, 1986, 61-99233; Jul. 16, 1986, 61-167466; Jul. 16, 1986, 61-167467; Jul. 16, 1986, 61-167468; Jul. 16, 1986, 61-167470

Int. Cl.[5] G03B *3/00, 7/095, 7/16, 15/03*

U.S. Cl. 354—400 **3 Claims**



1. Control device for use in a camera having an objective lens, comprising:

means for detecting a distance from the camera to an object to be photographed to produce a distance signal indicative of the detected distance;

means for driving the objective lens in accordance with the distance signal;

means for receiving light coming from a first; region which is a relatively small area in an object area to be photographed to produce a first light receiving signal indicative of the measured amount of light;

means for receiving light coming from a second region which is wider than the first region to produce a second light receiving signal indicative of the measured amount of light;

means for detecting whether a primary object to be photographed is in backlight condition or not, in accordance with the first and second light receiving signals;

means for illuminating the object area;

means for calculating a first aperture value on the basis of the second light receiving signal;

means for calculating a second aperture value on the basis of the distance signal;

means for calculating a third aperture value on the basis of the first light receiving signal;

means for comparing the first aperture value with the second aperture value; and

means for controlling exposure operation of the camera, if the backlight condition is detected, on the basis of the second light receiving signal with energizing the illuminating means when the first aperture value is smaller than the second aperture value, while controlling the exposure operation on the basis of the third aperture value when the first aperture value is equal to or larger than the second aperture value.

4,959,677

DEVICE FOR DETECTING THE FOCUS ADJUSTED STATE OF AN OBJECTING LENS

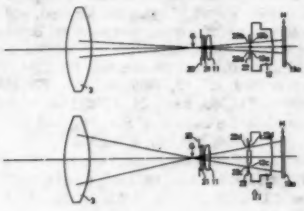
Yasuo Suda, Yokohama; Kazuhiko Arakawa, Kawasaki; Keiji Ohtaka, Tokyo; Takeshi Koyama, Tokyo, and Ichiro Ohnuki, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 102,622, Sep. 30, 1987. This application Jun. 30, 1989, Ser. No. 373,697

Claims priority, application Japan, Oct. 1, 1986, 61-231328; Oct. 1, 1986, 61-231329; Oct. 1, 1986, 61-231330

Int. Cl.[5] G03B *13/36*

U.S. Cl. 354—402 10 Claims



1. A focus detecting device comprising:

a plurality of secondary imaging optical systems each forming a pair of light distributions whose relative positions vary in conformity with the focus adjusted state of an objective lens with respect to an object image, the secondary imaging optical systems being disposed so that a direction in which the relative positions of one of said pair of light distributions varies is different from a direction in which the relative positions of another of said pair of light distributions varies;

an objective lens having a pupil through which pass the pairs of light distributions; and

a plurality of focus detecting sensors for receiving the pairs of light distributions,

wherein said plurality of optical systems are disposed so that a first optical spacing between areas of said pupil through which the light distributions of said one pair pass differs from a second optical spacing between areas of said pupil through which the light distributions of said another pair pass, each optical system comprising a pair of lenses.

4,959,678

AUTOMATIC FOCUSING CAMERA

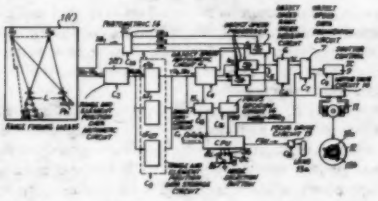
Tadashi Nakagawa, Chiba, Japan, assignor to Seikosha Co., Ltd., Tokyo, Japan

Filed Nov. 30, 1989, Ser. No. 444,070

Claims priority, application Japan, Nov. 30, 1988, 63-303529

Int. Cl.[5] G03B *13/00*

U.S. Cl. 354—403 43 Claims



1. An automatic focusing camera comprising:

range finding means for measuring the distance of said camera to an object and for providing a time base electrical signal corresponding thereto, said range finding means including first through nth elements disposed in parallel to each other which measure said distance;

range and element position data arithmetic means for producing range data of the camera to the object and for producing element position data of active ones of said first through nth elements, in response to said time base electrical signal; and

object speed arithmetic means for producing a time base speed signal corresponding to the speed of said object in response to said range data and said element position data.

4,959,679

CAMERA SYSTEM

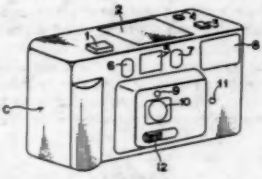
Kouji Yamamoto, Sakai; Shinji Tominaga, Osaka; Akira Yamanaka, Sakai; Hiroshi Ueda, Nara; Nobuyuki Taniguchi, Tondabayashi; Ikushi Nakamura, and Michihiro Iwata, both of Sakai, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 169,451, Mar. 17, 1988, abandoned, which is a continuation of Ser. No. 797,510, Nov. 13, 1985, abandoned. This application Jun. 29, 1989, Ser. No. 374,574

Claims priority, application Japan, Nov. 14, 1984, 59-173261; Dec. 28, 1984, 59-197143; Feb. 27, 1985, 60-28848; Mar. 8, 1985, 60-33950; Mar. 12, 1985, 60-35962; Mar. 12, 1985, 60-35963; Mar. 27, 1985, 60-45490; Mar. 27, 1985, 60-45491; Mar. 28, 1985, 60-46676; Mar. 28, 1985, 60-46677; Mar. 28, 1985, 60-46678

Int. Cl.[5] G03B *15/03, 17/18*

U.S. Cl. 354—419 19 Claims



1. A mode setting device for use in a camera, comprising:

operable means;

means for outputting a signal in response to the operation of said operable means;

memory means whose contents are changed in response to the signal outputted by said outputting means;

means for measuring brightness of an object;

means for judging whether or not the brightness measured by said measuring means is less than a predetermined value;

first control means for controlling exposure;

means for emitting flash light during the operation of said first control means;

second control means for enabling said emitting means to emit the flash light when the contents of said memory means are a first value and the measured brightness is less than the predetermined value, or when the contents of said memory means are a second value, and for disabling said emitting means from emitting the flash light when the contents of said memory means are at the first value and the measured brightness is greater than the predetermined value, or when the contents of said memory means are a third value; and

means for resetting the contents of said memory means to the first value in response to the completion of the operation of said first control means.

4,959,680

CAMERA SYSTEM

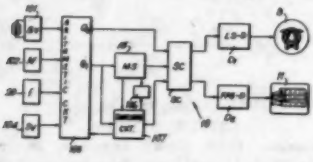
Hiroaki Ishida; Ichiro Nemoto; Koji Sato; Atsushi Takami; Yoichi Nakano; Isamu Ishii, and Yoshiyuki Iwamatsu, all of Chiba, Japan, assignors to Seikosha Co., Ltd., Tokyo, Japan

Filed Jun. 28, 1989, Ser. No. 372,729

Claims priority, application Japan, Jun. 29, 1988, 63-161308; Jul. 4, 1988, 63-166398

Int. Cl.[5] G03B *7/00, 9/00*

U.S. Cl. 354—435 **13 Claims**



1. A camera system of the type having a lens shutter for performing a programmed exposure operation with a programmed exposure value and a diaphragm-adjusting operation, a focal-plane shutter and an aperture defined by said lens shutter and through which an image of a subject to be photographed is passed for recording on a photosensitive material, said camera system comprising:

(a) operation mode setting means for setting an operation mode of said camera system to one of the following modes:

(i) a lens shutter mode in which the lens shutter is operated as a programmed shutter, and

(ii) a focal-plane shutter mode in which shutter speed is controlled by the focal-plane shutter and the aperture of the camera system is controlled by said lens shutter;

(b) selector means for controlling said setting means to set the operation mode of said camera system to one of the lens shutter mode and the focal-plane shutter mode; and

(c) switching means for controlling said setting means to switch the operation mode of the camera system to the focal-plane shutter mode irrespective of the setting of the selector means when an exposure value to be controlled exceeds the programmed exposure value of the lens shutter.

4,959,681

IMAGE FORMING APPARATUS

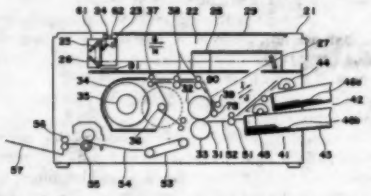
Mitsuru Ogura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 9, 1988, Ser. No. 282,327

Claims priority, application Japan, Dec. 14, 1987, 62-317218

Int. Cl.[5] G03B *27/32*

U.S. Cl. 355—27 **7 Claims**



1. In an image forming apparatus for forming a colored image of an original by forming a selective hardened image through image-making an exposure onto a photoreceptive sheet coated with microcapsules containing colorless dyes and photo-hardening agents therein, overlapping the photoreceptive sheet with an image receiving sheet coated with a developing material, and pressing the photoreceptive sheet and the image receiving sheet together to transfer the non-hardened image, thereby forming a developed color image on the image receiving sheet, comprising:

movable original scanning means for scanning and exposing an image of a static original onto the photoreceptive sheet;

transfer means for transferring the image on the photoreceptive sheet to the image receiving sheet;

suspension means, provided between said movable original scanning means and said transfer means, for suspending the photoreceptive sheet; and

driving means for moving both said original scanning means and said suspension means.

4,959,682

COPYING APPARATUS

Takemi Yamamoto; Ryohei Komiya, both of Nagoya; Naoyuki Hatta, Gamagori; Yumio Matsumoto, Kasugai, and Fumihiro Sunda, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan

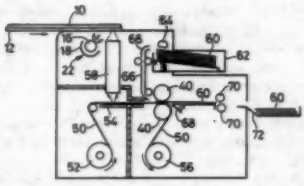
Filed Jul. 13, 1989, Ser. No. 379,339

This application filed Jul. 13, 1989, Ser. No. 379,339Continuation of Ser. No. 172,383, Mar. 24, 1988, Pat. No. 4,870,444, which is a continuation-in-part of Ser. No. 943,195, Dec. 18, 1986, Pat. No. 4,742,374

Claims priority, application Japan, Dec. 24, 1985, 60-291159; Mar. 25, 1986, 61-64925; Jun. 10, 1987, 62-89131[U]

Int. Cl.[5] G03B *27/32, 27/52, 27/00, 27/54*

U.S. Cl. 355—27 **9 Claims**



1. A copying apparatus operable with an original having an image-bearing surface on which images to be reproduced are supported, comprising:

an image-illuminating device operable to produce a light for illuminating said image-bearing surface on the original;

a photosensitive web disposed for exposure to the light reflected by said image-bearing surface of the original, said photosensitive web having a multiplicity of microcapsules each of which contains a chromogenic material, and a photosensitive resin which is sensitive to rays included in the light reflected by said image-bearing surface of the original;

an optical system for converging and thereby focusing said reflected light on a surface of said photosensitive web, to image-wise expose said microcapsules, for forming latent images corresponding to said images on said original;

a feeding device comprising a storage means for accommodating a stack of recording cut sheets, and means for feeding said cut sheets one after another, and said photosensitive web, each of said recording cut sheets having a developer layer with which said chromogenic material of each said microcapsule of said photosensitive web is adapted to react; and

a developing device comprising a pair of nip rollers defining a pressure nip, and means for superposing each said recording cut sheet and an image-wise exposed portion of said photosensitive web on each other and guiding the superposed cut sheet and image-wise exposed portion f the web through said pressure nip, so as to cause an image-wise reaction between said chromogenic material of said microcapsules and said developer layer, thereby developing said latent images on said photosensitive web into visible images on each said cut sheet.

4,959,683

PHOTOGRAPHIC PICTURE DISPLAY, APPARATUS AND METHOD OF MAKING ELEMENTAL PRINTS THEREOF

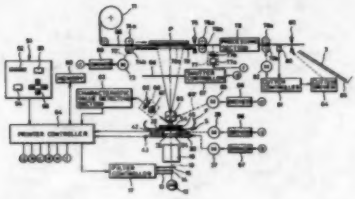
Katsumi Otake, Tokyo; Kiichiro Sakamoto, Kanagawa, and Mikio Kogane, Tokyo, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 196,524, May 20, 1980, Pat. No. 4,897,944. This application Nov. 9, 1989, Ser. No. 435,131

Claims priority, application Japan, May 20, 1987, 62-123053; Jun. 12, 1987, 62-146654; Jun. 17, 1987, 62-150810

Int. Cl.[5] G03B *29/00, 27/44, 27/32*

U.S. Cl. 355—28 11 Claims



1. A method of making picture strips arranged on a display panel for forming a single picture, each picture strip including divisional images of a row or a column of smaller divisions of a matrix into which an image frame of a film is notionally divided, said method comprising the steps of:

moving a film carrier in such a way to place said notionally divided smaller divisions in an exposure position;

exposing a photographic paper to enlarged images of said smaller divisions in divided order for each row or column of said matrix;

processing said exposed photographic paper to provide a print of a series of rows or columns of said enlarged divisional images of said smaller divisions; and

cutting off said print by row or column to thereby provide picture strips.

4,959,684

COPYING MACHINE

Hideo Ito, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 2, 1989, Ser. No. 360,999

Claims priority, application Japan, Jun. 6, 1988, 63-139191; Jun. 6, 1988, 63-139192

Int. Cl.[5] G03B *27/52;* G03G *15/00*

U.S. Cl. 355—55 15 Claims

1. A copying machine comprising:

image forming means for forming an image of an original to be copied on a copying paper;

magnifying means for setting copy magnifications in a longitudinal direction and a lateral direction independently;

first selecting means for selecting any one of the copy magnifications preliminarily stored;

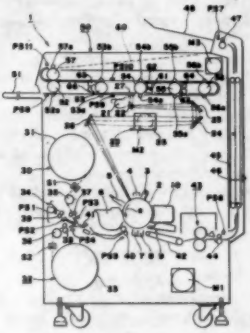
first magnification control means for controlling said magnifying means so that the copy of the original has such magnifications in the longitudinal and lateral directions as selected by said first selecting means;

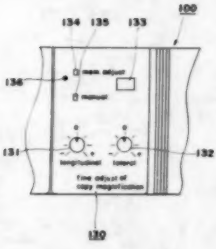
a plurality of memory means each comprising memory areas for storing a pair of adjusting values for adjusting the copy magnifications, the pair of adjusting values being a first adjusting value in the longitudinal direction and a second adjusting value in the lateral direction;

second selecting means for selecting one of said memory means;

second magnification control means for controlling said magnifying means based on the pair of adjusting values stored in said selected memory means and the copy magnifications selected by said first selecting means;

whereby the copy magnification in the longitudinal direction is set based on the copy magnification selected by said





first selecting means and the first adjusting value and the copy magnification in the lateral direction is set based on the copy magnification selected by said first selecting means and the second adjusting value.

4,959,685

IMAGE FORMING APPARATUS PROVIDED WITH A SHEET STORING UNIT

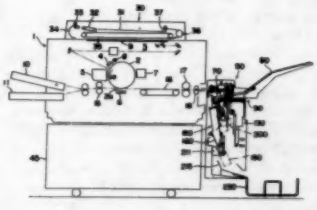
Akio Kato, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 394,654, Aug. 16, 1989, abandoned. This application Feb. 27, 1990, Ser. No. 488,421

Claims priority, application Japan, Aug. 19, 1988, 63-206958; Aug. 19, 1988, 63-206959; Aug. 19, 1988, 63-206960

Int. Cl.[5] G03B *27/58*

U.S. Cl. 355—72 10 Claims



1. An image forming apparatus comprising:

means for forming an image on a sheet;

means for generating a signal commanding said image forming means to perform an image forming operation;

a tray for receiving sheets, which is movable up and down;

means for transporting sheets ejected from said image forming means to said tray;

drive means for moving up and down said tray toward and away from a sheet ejection portion of said transporting means;

first control means for commanding said drive means to move said tray to a proper position, where the upper surface of said tray or the upper surface of sheets stacked thereon is positioned below the sheet ejection portion of said transporting means with a specified space, when said commanding means generates a command signal to start an image forming operation: and

second control means for inhibiting the image forming operation while said drive means is in operation at the request of said first control means.

4,959,686

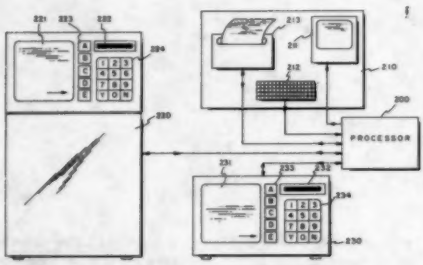
AUTOMATED SHOPPING ORDER ENTRY SYSTEM

John J. Spallone, New Milford; William E. Doyle, Monroe, and Peter Cawley, Waterbury, all of Conn., assignors to Dexter Systems, Inc., New Milford, Conn.

Filed Feb. 24, 1988, Ser. No. 159,758

Int. Cl.[5] G06F *15/21*

U.S. Cl. 364—401 **8 Claims**



1. A system for automated shopping order entry for the delicatessen station of a supermarket, comprising:

a processor subsystem including: means for storing data describing items available for purchase; means for computing and storing an estimated waiting time; means for controlling a sequence for shopping item data presentation for selection by a customer; selection data storage means for storing data representative of a customer's item selections; and means for controlling printing of a customer's item selections and the estimated waiting time;

a customer subsystem, coupled with said processor subsystem, and including: a display for displaying shopping item data to a customer; customer input means for receiving customer item selection inputs to be stored by said selection data storage means; and customer printing means responsive to said printing controlling means for printing a customer copy of the customer item selections and said waiting time; and

an employee subsystem, coupled with said processing subsystem, and including employee printing means responsive to said printing controlling means for printing an employee copy of said customer item selections;

said means for computing and storing an estimated waiting time including means for accumulating a variable workload based on a prior workload, the number of items ordered by customers, the number of employees working on filling orders, and a periodic time decrement, and means for computing and storing said estimated waiting time as a function of said variable workload.

4,959,687

BIAS POWER SOURCE CONTROLLER FOR AN IMAGE FORMING APPARATUS

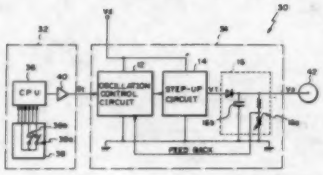
Eiichi Katoh; Hitoshi Hoshi; Tsunehide Takahashi, and Koichi Asakura, all of Tokyo, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

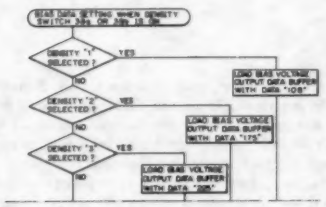
Filed Aug. 5, 1988, Ser. No. 228,462

Claims priority, application Japan, Aug. 13, 1987, 62-200972

Int. Cl.[5] G03G *21/00*

U.S. Cl. 355—214 **3 Claims**





1. A controller for an image forming apparatus for controlling a bias power source to vary the level of a bias voltage outputted by said bias power source in order to provide desired image density, said controller comprising:

density selecting means for selecting a desired image density;

trigger pulse generating means for generating a trigger pulse signal for triggering said bias power source so that bias power source outputs a bias voltage corresponding to said selected image density;

control means for controlling the pulse width of said trigger pulse signal so that the pulse width conforms to said selected image density; and

means for causing said bias voltage to have a discharge time constant and means for providing a period of said trigger pulse signal which period is much smaller than said discharge time constant so that any ripples in said bias voltage which are ascribable to the modulation of said pulse width of said trigger pulse are substantially negligible.

4,959,688

IMAGE FORMING APPARATUS HAVING CHARGING AND DISCHARGING MEANS

Noribumi Koitabashi, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1988, Ser. No. 259,700

Claims priority, application Japan, Oct. 19, 1987, 62-263106; Dec. 28, 1987, 62-336342

Int. Cl.[5] G03G *15/02, 15/16*

U.S. Cl. 355—219 **49 Claims**

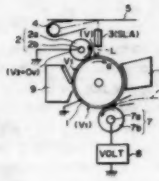
1. An image forming apparatus, comprising:

a movable image bearing member;

latent image forming means for forming a latent image on a surface of said image bearing member;

contact type charging means contactable to said image bearing member for charging said image bearing member before the latent image is formed on said image bearing member by said latent image forming means; and

discharging means contactable to the surface of said image bearing member at a position between a latent image forming station having said latent image forming means and a charging station having said charging means where said image bearing member is electrically charged to



discharge the surface of said image bearing member to provide a surface potential of said image bearing member having an absolute value which is not less than an absolute value of a charge starting voltage V_{TH} (V) of said image bearing member.

4,959,689

ELECTROPHOTOGRAPHIC PLATE-MAKING MACHINE WITH INDEPENDENT MOTORS FOR MOVING THE COPY HOLDER, CONVEYING ROLLERS AND FOCUS REGION ROLLERS

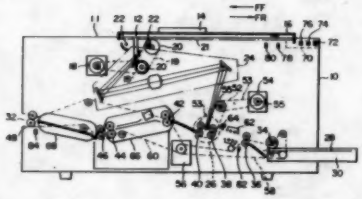
Nobuyoshi Hatori; Tamio Iwamoto, both of Tokyo, and Akira Kobashikawa, Okinawa, all of Japan, assignors to Iwatsu Electric Co., Ltd., Tokyo, Japan

Filed Oct. 26, 1989, Ser. No. 428,069

Claims priority, application Japan, Oct. 29, 1988, 63-271973

Int. Cl.[5] G03G *15/28, 21/00*

U.S. Cl. 355—233 **11 Claims**



1. An electrophotographic plate-making machine comprising:

a casing having a wall means provided with a slit for allowing a light beam to pass therethrough, a feeding means for feeding a sensitive paper, and an outlet for a treated sensitive paper;

a copy holder arranged on said wall means and movable toward and away from said slit;

a first electric drive motor operatively connected to and able to move said copy holder;

a light source adapted for effecting a scanning exposure and arranged in said casing to direct a light beam on to a copy carried by said copy holder;

an optical unit arranged in said casing so that a light beam reflected at said copy passed through said optical unit and is focused at a focus region;

means for conveying a sensitive paper from said feeding means to said outlet along a predetermined travel path through said focus region, said conveying means comprising a plurality of conveying roller means arranged along said travel path and at least one focus region roller means arranged at said focus region in series with said conveying roller means, said focus region roller means being operative independently of said conveying roller means;

a second electric drive motor operatively connected to and able to move said conveying roller means; and

a third electric drive motor operatively connected to and able to move said focus region roller means;

whereby said first, second and third electric drive motor, respectively, can move said copy holder, said conveying roller means and said focus region roller means independently of each other, so that a first scanning exposure can be carried out on a portion of a sensitive paper carried by said focus region roller means while said copy holder is moved in one direction toward said slit, said copy holder is returned in the reverse direction while said sensitive paper is held at said focus region, and then a second scanning exposure can be carried out on the remaining portion of the sensitive paper while said copy holder is again moved in one direction toward said slit.

4,959,690

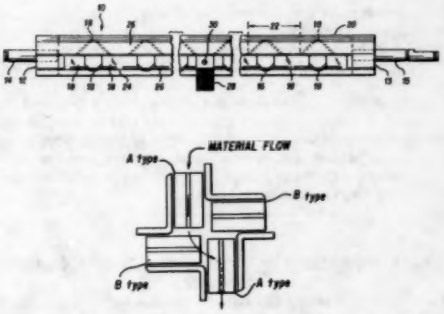
PADDLE WHEEL CROSS-MIXER

John W. Trainor, Vestal, and Bruce E. Holtje, Castle Creek, both of N.Y., assignors to Imagitek, Inc., Binghamton, N.Y.

Filed Feb. 6, 1989, Ser. No. 307,317

Int. Cl.[5] G03G *15/08*

U.S. Cl. 355—245 **8 Claims**



1. A mixer for developer mixture in a photocopier, comprising:

a rod shaped body with means for rotation about a longitudinal axis of said body;

at least a first and a second row of mixing baffles, said rows of mixing baffles being parallel to said longitudinal axis;

at least two lifting plates, said lifting plates being parallel to said longitudinal axis; and

wherein said rows of mixing baffles are alternated with said lifting plates whereby said mixture after being lifted by one of said lifting plates flows over said first row of baffles and then directly over said second row of baffles.

4,959,691

MAGNETIC BRUSH FORMING DEVICE FOR IMAGE GENERATING APPARATUS

Tsumori Satoh, Yokosuka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Dec. 9, 1988, Ser. No. 281,753

Claims priority, application Japan, Dec. 11, 1987, 62-313490; Mar. 24, 1988, 63-068300

Int. Cl.[5] G03B *9/40, 9/06*

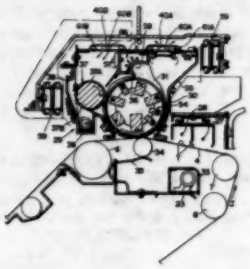
U.S. Cl. 355—246 **12 Claims**

1. A magnetic brush forming device for use in an image generating apparatus, comprising:

a brush carrier for carrying an agent containing a carrier and a toner and transferring the agent while forming a magnetic brush of the agent;

a limiting member for limiting the thickness of a layer of said agent carried on said brush carrier, said limiting member being of a hollow structure for allowing air to flow therein;

wherein said brush carrier serves as a component in a rotational assembly in a magnetic brush developing device and comprises a sleeve of a non-magnetic material having opposite ends supported by sleeve support means, said rotational assembly comprising a through member extending axially through said sleeve, a magnet on said through



member, and through member support means supporting opposite ends of said through member, said sleeve and said through member being relatively rotatable, and said opposite ends of said sleeve communicating with ambient air; and

wherein said opposite ends of said sleeve are rotatably supported respectively on side plates, said magnet being mounted on said through hole in a region thereof positioned within said sleeve, said opposite ends of said through member projecting out of said opposite ends and being fixed to said lateral plates.

4,959,692

DEVELOPING DEVICE WITH RETRACTABLE CUTOFF MEMBER

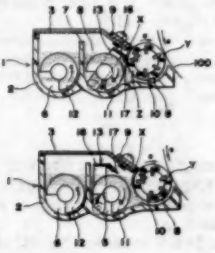
Yuji Hayashi; Susumu Sakakibara, and Katsumi Maeda, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 9, 1988, Ser. No. 282,449

Claims priority, application Japan, Dec. 11, 1987, 62-314428

Int. Cl.[5] G03G *15/09*

U.S. Cl. 355—253 **6 Claims**



1. A developing device comprising:

a developing sleeve rotatably provided in the vicinity of an electrostatic latent image support member;

a supply means for supplying developer to the peripheral surface of said developing sleeve;

a bristle height regulating member for regulating amount of the developer transported, according to rotation of said developing sleeve, on the peripheral surface of said developing sleeve towards a developing region where said developing sleeve confronts said electrostatic latent image support member;

a removal means for removing from the peripheral surface of said developing sleeve the developer having passed through the developing region;

a cutoff member for cutting off supply of the developer from said supply means to said developing sleeve, said cutoff member being so provided as to be retractably projected into a developer supply region defined between said developing sleeve and said supply means; and

a magnet member which is fixedly provided in said developing sleeve and includes a developing magnetic pole confronting said electrostatic latent image support member, a first magnetic pole confronting said bristle height regulating member and a second magnetic pole confronting the developer supply region, said second magnetic pole having a polarity identical with that of said first magnetic pole such that the developer is continuously held in an erect state on said developing sleeve by said first and second magnetic poles.

4,959,693

DUPLEX REPRODUCING APPARATUS WITH DEVICE FOR COOLING AND CONVEYING FUSED TONER IMAGE

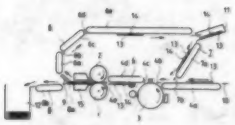
Teruaki Mitsuya, Katsuta; Takao Kumasaka, Takahagi; Takao Umeda, Mito; Yasuro Hori, Katsuta; Ikuo Shimokobe, Katsuta, and Nobuyoshi Hoshi, Katsuta, all of Japan, assignors to Hitachi, Ltd. and Hitachi Koki Co., Ltd., both of Tokyo, Japan

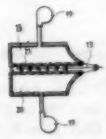
Filed Nov. 3, 1988, Ser. No. 266,842

Claims priority, application Japan, Nov. 10, 1987, 62-282179

Int. Cl.[5] G03G *15/20*

U.S. Cl. 355—290 **9 Claims**





1. A duplex reproducing apparatus comprising an image forming station, a fixing station and an inversion recording sheet carrying passage, a toner image is generated on a first face of a recording sheet in said image forming station, the toner image being fused, solidified and fixed on the recording sheet in said fixing station, and the recording sheet is turned over through said inversion recording sheet carrying passage and is fed again into said image forming station thereafter to generate a second toner image on a second face of the recording sheet, the second toner image being fused, solidified and fixed on the recording sheet in said fixing station,

said duplex reproducing apparatus further comprising support means for carrying the recording sheet from said fixing station while supporting the recording sheet out of contact with any solid members, the support means including means for providing an air stream which carries

and cools the recording sheet and the toner image thereon until the toner image on the recording sheet is solidified.

4,959,694

SEMICONDUCTOR HETEROSTRUCTURES WITH SIGE MATERIAL

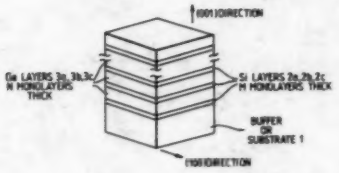
Michael A. Gell, Ipswich, England, assignor to British Telecommunications public limited company, England

Filed Dec. 23, 1988, Ser. No. 288,828

Claims priority, application United Kingdom, Dec. 23, 1987, 8729953; Mar. 28, 1988, 8807350; Jul. 27, 1988, 8817884; Aug. 25, 1988, 8820150

Int. Cl.[3] H01L *29/165*

U.S. Cl. 357—16 **23 Claims**



1. A semiconductor device comprising a short-period superlattice of alternating layers of first and second materials of different compositions within the Si/Ge system grown epitaxially on an (100) oriented substrate, the first material layers containing substantially more silicon than the second, the first material layers being M monolayers thick, the second material layers being N monolayers thick, M being smaller than N.

4,959,695

METHOD AND APPARATUS FOR FORMING A MULTICOLOR PICTURE BY ELECTROPHOTOGRAPHY

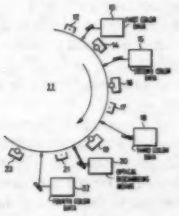
Katsuhiko Nishimura; Kazuyuki Shinbo, and Masahiro Kita, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 9, 1987, Ser. No. 36,512

Claims priority, application Japan, Apr. 9, 1986, 61-81895

Int. Cl.[5] G03G *15/01, 15/02*

U.S. Cl. 355—327 **8 Claims**



1. An electrographic method for forming a multicolor picture, comprising the steps of:

forming a first color image on a photosensitive material by applying first color data to said photosensitive material and developing said photosensitive material, thereby causing first color toner to adhere to said photosensitive material;

forming a second color image on said photosensitive material by applying second color data to said photosensitive material and developing said photosensitive material, thereby causing second color toner to adhere to said photosensitive material;

forming a third color image on said photosensitive material by applying third color data to said photosensitive material and developing said photosensitive material, thereby causing third color toner to adhere to said photosensitive material;

then discharging all of a surface of said photosensitive material to decrease a surface potential thereof;

recharging said discharging surface; and

forming a fourth color image on said recharged surface of said photosensitive material by applying fourth color data to said recharged surface and developing said photosensitive material, thereby causing fourth color toner to adhere to said photosensitive material already having said first, second and third color toners adhered thereto,

wherein at least one of said first, second and third color images is formed by a developing process using negatively charged toner and at least another one of said first, second and third color images is formed by a developing process using positively charged toner.

4,959,696

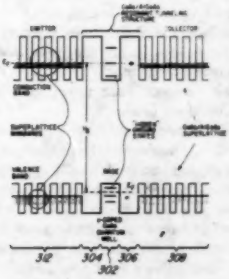
THREE TERMINAL TUNNELING DEVICE AND METHOD

William R. Frensley, Richardson, and Mark A. Reed, Dallas, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Continuation-in-part of Ser. No. 231,622, Aug. 8, 1988, which is a continuation of Ser. No. 825,720, Jan. 31, 1986, abandoned, which is a continuation-in-part of Ser. No. 768,542, Aug. 23, 1985, abandoned. This application Oct. 26, 1988, Ser. No. 263,085

Int. Cl.[5] H01L *29/161, 29/205, 29/225*

U.S. Cl. 357—16 **6 Claims**



1. A resonant tunneling device, comprising:

(a) a narrow bandgap semiconductor material quantum well;

(b) first and second spaced apart, wide bandgap semiconductor material tunneling barriers abutting said well;

(c) an emitter abutting said first tunneling barrier, said emitter having a superlattice of alternating layers of said narrow bandgap semiconductor material and said wide bandgap semiconductor material;

(d) a collector abutting said second tunneling barrier; and

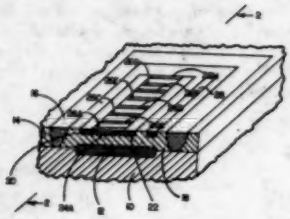
(e) a base in electrical communication with said well to inject and withdraw carriers from said well to control resonant tunneling of carriers from said emitter through a subband in said well into said collector.

4,959,697

SHORT CHANNEL JUNCTION FIELD EFFECT TRANSISTOR

John S. Shier, Apple Valley, and Matthew F. Schmidt, Bloomington, both of Minn., assignors to VTC Incorporated, Bloomington, Minn.

Continuation of Ser. No. 221,524, Jul. 20, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,803
Int. Cl.[5] H01L 29/80
U.S. Cl. 357—22 2 Claims



1. A rapid switching junction field effect transistor incorporated into a first conductivity type epitaxial layer of an integrated circuit, the junction field effect transistor comprising:

a gate region formed from an electrically isolated portion of the epitaxial layer and having a surface thereon;

a pair of spaced-apart regions of a second conductivity type extending into the gate region from the surface thereof;

a plurality of subsurface channels of the second conductivity type extending between the pair of spaced-apart regions of the second conductivity type, the subsurface channels being spaced from each other by segments of the first conductivity type gate region;

a plurality of upper gate regions of an enhanced first conductivity type, each upper gate region being located between a subsurface channel and the surface wherein each upper gate region is vertically aligned with and adjacent its respective subsurface channel;

a diode junction between each upper gate region and its respective subsurface channel;

an enhanced first conductivity type gate contact region extending from the surface of the gate region into a region of the gate region at an area laterally spaced from the pair of spaced-apart regions of the second conductivity type and the upper gate regions; and

a buried layer of an enhanced first conductivity type underlying the plurality of subsurface channels and the enhanced first conductivity type gate contact region;

electrodes connected to the pair of spaced-apart regions and to the gate contact region to define a source, a drain and a gate; and

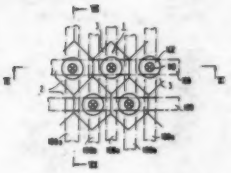
a primary electrical conduction path located between the subsurface channels and the gate contact region through the plurality of upper gate regions, through the segments of the gate region substantially adjacent the subsurface channels and the gate region to the buried layer and through the buried layer and the gate region to the enhanced gate contact region, wherein extension of space charge depletion zones into the subsurface channels occurs primarily from the diode junction between the subsurface channels and the upper gate regions upon application of an appropriate electrical potential to the gate contact region.

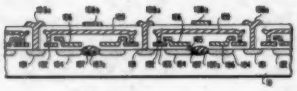
4,959,698

MEMORY CELL OF A SEMICONDUCTOR MEMORY DEVICE

Satoh Shinichi, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 104,921, Oct. 6, 1987, abandoned. This application Jun. 14, 1989, Ser. No. 368,158
Claims priority, application Japan, Oct. 8, 1986, 61-240695; Oct. 22, 1986, 61-252563; Nov. 13, 1986, 61-270711; Nov. 13, 1986, 61-270713
Int. Cl.[5] H01L 27/02, 29/78, 27/10
U.S. Cl. 357—23.6 37 Claims





1. A memory cell in a semiconductor memory device comprising a plurality of memory cells, said memory cell comprising:

a substrate;

a transistor comprising first and second transistor electrodes and a ring-shaped gate electrode;

a capacitor comprising first and second capacitor electrodes;

an isolating region for isolating said memory cell from adjacent ones of said memory cells; and

a gate insulator formed around said first transistor electrode and on a major surface of said substrate;

wherein:

said first transistor electrode is formed in said major surface of said substrate;

said ring-shaped gate electrode is formed around said first transistor electrode on said major surface of said substrate and is separated from said first electrode by said gate insulator, an inner circumference of said ring-shaped gate electrode overlapping an outer circumference of said first transistor electrode through said gate insulator;

said second transistor electrode is formed around said ring-shaped gate electrode in said major surface of said substrate, an inner circumference of said second transistor electrode overlapping an outer circumference of said ring-shaped gate electrode through said gate insulator;

said capacitor is formed between said isolating region and said ring-shaped gate electrode and is connected electrically to said transistor; and

wherein said first and second transistor electrodes are shaped such that a current path between said first and second transistor electrodes is never parallel to a boundary between said isolating region and a remaining portion of said memory cell.

4,959,699

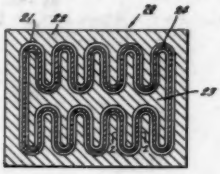
HIGH POWER MOSFET WITH LOW ON-RESISTANCE AND HIGH BREAKDOWN VOLTAGE

Alexander Lidow, Manhattan Beach, and Thomas Herman, Redondo Beach, both of Calif., assignors to International Rectifier Corporation, El Segundo, Calif.

Continuation of Ser. No. 90,664, Aug. 27, 1987, abandoned, which is a division of Ser. No. 456,813, Jan. 10, 1983, abandoned, which is a division of Ser. No. 232,713, Feb. 9, 1981, Pat. No. 4,376,286, which is a continuation of Ser. No. 951,310, Oct. 13, 1978, abandoned. This application Jun. 22, 1989, Ser. No. 371,678

Int. Cl.[5] H01L 29/68, 29/10, 27/02

U.S. Cl. 357—23.7 24 Claims



1. A high power metal oxide silicon field effect transistor device exhibiting relatively low on-resistance and relatively high breakdown voltage; said device comprising:

a wafer of semiconductor material having first and second opposing semiconductor surfaces; said wafer of semiconductor material having a relatively lightly doped major body portion for receiving junctions and being doped with impurities of one conductivity type;

at least first and second spaced base regions of the opposite conductivity type to said one conductivity type formed in said wafer and extending from said first semiconductor surface to a first depth beneath said first semiconductor surface; the space between said at least first and second base regions defining a common conduction region of one conductivity type at a given first semiconductor surface location;

first and second source regions of said one conductivity type formed in each pair of said at least first and second base regions respectively at first and second first surface location to a depth less than said first depth; the outer rim of each of said first and second source regions being laterally spaced along said first semiconductor surface from the lateral outer periphery of its said base region to define first and second channel regions along said first semiconductor surface between each pair of said first and second source regions, respectively, and said common conduction region;

source electrode means connected to said source regions;

gate insulation layer means on said first surface, disposed at least on said first and second channel regions;

gate electrode means on said gate insulation layer means and overlying said first and second channel regions;

a drain conductive region remote from said common region and separated therefrom by said relatively lightly doped major body portion;

a drain electrode coupled to said drain conductive region; and

at least said first base region being a cellular polygonal region; said cellular polygonal region being surrounded by said common conduction region; said first source region having the shape of an annular ring disposed within said cellular polygonal first base region.

4,959,700

INSULATED GATE FIELD EFFECT TRANSISTOR AND ITS MANUFACTURING METHOD

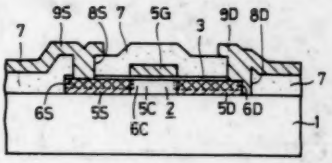
Shunpei Yamazaki, Tokyo, Japan, assignor to Semiconductor Energy Laboratory Co., Ltd., Kanagawa, Japan

Continuation of Ser. No. 735,697, May 20, 1985, abandoned. This application Feb. 3, 1988, Ser. No. 153,477

Claims priority, application Japan, May 18, 1984, 59-100250; May 18, 1984, 59-100251; May 18, 1984, 59-100252

Int. Cl.[5] H01L 29/78

U.S. Cl. 357—23.7 9 Claims



1. An insulated gate field effect transistor comprising:

a non-single-crystalline semiconductor layer formed on a substrate;

a gate electrode formed on a portion of the surface of said semiconductor layer;

a gate insulated film disposed between said gate electrode and said semiconductor layer;

a non-single-crystalline channel region defined within said semiconductor layer just below said gate electrode;

a source region and a drain region which are transformed from and defined within said semiconductor layer immediately adjacent to said channel region in an opposed relation, said source and drain regions being crystallized to a higher degree than that of said channel region by selectively irradiating portions of said semiconductor layer using said gate electrode as a mask.

4,959,701

VARIABLE SENSITIVITY FLOATING GATE PHOTOSENSOR

Leroy Colquitt, Jr., Columbia; Fred R. Sutherland, Catonsville, both of Md., and Edward J. Boling, Newtown, Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 1, 1989, Ser. No. 345,871

Int. Cl.[5] H01L 29/78

U.S. Cl. 357—24 21 Claims

1. A floating gate semiconductor device operable in either an enhanced transit speed mode or an enhanced responsivity mode, comprising:

first and second contiguous layers of semiconductor material of different conductivity types, wherein said first layer includes a drain means at one end for receiving a flow of charges, and a buried channel that directs said flow of charges along a selected depth within said first layer, and

a floating gate assembly disposed over said buried channel for detecting changes in the flow of said charges, including a first gate electrode for selectively emanating an electric field that changes the width of the buried channel and hence varies the depth of the buried channel within

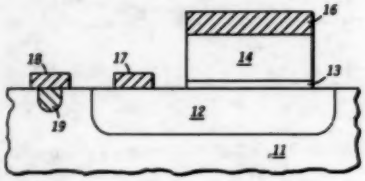
the first layer when a biasing voltage is applied thereto to enhance either the transit speed of the charges or the responsivity of the device, and a second gate electrode adjacent to the first gate electrode for detecting changes in the flow of said charges.

4,959,702

SI-GAP-SI HETEROJUNCTION BIPOLAR TRANSISTOR (HBT) ON SI SUBSTRATE

Curtis D. Moyer, and Raymond K. Tsui, both of Phoenix, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Oct. 5, 1989, Ser. No. 417,617
Int. Cl.[5] H01L 29/72, 29/161, 29/80
U.S. Cl. 357—34 11 Claims



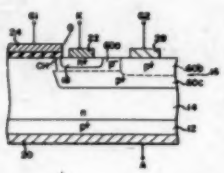
1. A heterojunction bipolar transistor (HBT) comprising: a silicon collector layer of a first conductivity type; a base region of a second conductivity type formed adjacent to the collector layer; an epitaxially grown gallium phosphide (GaP) region formed on top of of the base region; and an epitaxially grown silicon emitter of the first conductivity type formed over the GaP region.

4,959,703

TURN-ON/OFF DRIVING TECHNIQUE FOR INSULATED GATE THYRISTOR

Tsuneo Ogura, Kamakura, and Akio Nakagawa, Hiratsuka, both of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Division of Ser. No. 161,095, Feb. 26, 1988. This application Jun. 28, 1989, Ser. No. 373,279
Claims priority, application Japan, Feb. 26, 1987, 62-41307; Feb. 26, 1987, 62-41308; Feb. 26, 1987, 62-41316; Dec. 28, 1987, 62-330064
Int. Cl.[5] H01L 29/74
U.S. Cl. 357—38 12 Claims



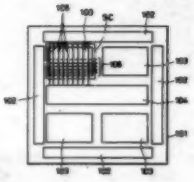
1. An insulated gate thyristor comprising:
a first emitter layer;
a first base layer;
a second emitter layer;
a second base layer having a bottom section;
a first gate electrode insulatively provided above said first base layer and a portion of said second base layer positioned between said first base layer and said second emitted layer, said first gate electrode forming a voltagecontrolled switching transistor together with said second emitter layer, said portion of said second base layer which serves as a channel region, and said first base layer;
a second gate electrode formed on said second base layer;
said second base layer comprising,
a first heavily doped region defined in said second base layer so as to be electrically in direct contact with said second gate electrode,
a lightly doped semiconductor region provided at least in said channel region of said transistor, and
a second heavily doped region defined at a bottom section of said second base layer to be in contact with said first heavily doped region.

4,959,704

SEMICONDUCTOR INTEGRATED CIRCUIT DEVICE

Satoru Isomura, Nishitama; Masato Iwabuchi, Hachioji, and Katsumi Ogiue, Nishitama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 25, 1988, Ser. No. 198,311
Claims priority, application Japan, May 27, 1987, 62-128233
Int. Cl.[5] H01L 27/02
U.S. Cl. 357—41 32 Claims



1. A semiconductor integrated circuit device comprising:
(a) a substantially rectangular plate-shaped integrated circuit chip having first and second principal surfaces which are in opposing relation to each other;
(b) a logic circuit block including plurality of logic gates provided at the substantially central position on said first principal surface of said chip;
(c) a first I/O cell group provided along a first edge of said first principal surface;
(d) a RAM type memory mat and a peripheral circuit thereof provided between said logic block and said first I/O cell group on said first principal surface, said memory mat having a multiplicity of word lines and complementary data line pairs, which intersect each other at right angles; and
(e) a plurality of signal lines interconnecting the respective I/O cells in said first I/O cell group and said logic block;
wherein said signal lines and said word lines are disposed so as to intersect each other at right angles over at least the entire width of the memory mat above which said signal lines extend transversely in a substantially straight-line form.

4,959,705

THREE METAL PERSONALIZATION OF APPLICATION SPECIFIC MONOLITHIC MICROWAVE INTEGRATED CIRCUIT

Zachary J. Lemnios; David G. McIntyre; Chung-I Im Lau, and Dennis A. Williams, all of Colorado Springs, Colo., assignors to Ford Microelectronics, Inc., Colorado Springs, Colo.

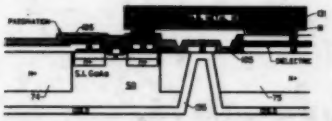
Filed Oct. 17, 1988, Ser. No. 258,607
Int. Cl.[5] H01L 27/02, 29/80, 29/78
U.S. Cl. 357—51 7 Claims

1. An integrated circuit structure comprising:
a semiconductor substrate containing a plurality of semiconductor device regions disposed in respective surface portions thereof and having formed thereon conductive material through which ohmic contact to said regions is effected;
a first metal layer provided on said semiconductor substrate

and having portions in ohmic contact with said conductive material and second portions extending over surface portions of said substrate spaced apart from said conductive material;

a dielectric layer disposed on selected ones of at least said second portions of said first metal layer;

a second metal layer formed on said dielectric layer overlying said selected ones of said second portions of said first metal layer and forming with said first metal layer and said dielectric layer therebetween capacitive reactance elements; and



a third metal layer, formed as an air bridge, which interconnects portions of said first metal layer with portions of said second metal layer and thereby conductively interconnects semiconductor device regions with capacitive reactance elements, wherein at least one portion of said third metal layer is configured as an inductive reactance so as to provide, together with a capacitive reactance to which said third metal layer is interconnected, an LC impedance circuit.

4,959,706

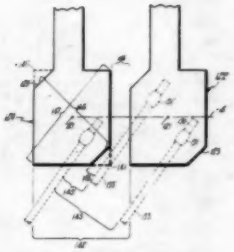
INTEGRATED CIRCUIT HAVING AN IMPROVED BOND PAD

Michael D. Cusack, Monument; Michael P. Hagen, and James E. Larkin, both of Colorado Springs, all of Colo., assignors to United Technologies Corporation, Hartford, Conn.

Filed May 23, 1988, Ser. No. 197,723

Int. Cl.[5] H01L *23/48, 29/44, 29/52*

U.S. Cl. 357—68 **14 Claims**



1. An integrated circuit module comprising:

a package for enclosing an integrated circuit and containing a plurality of package bond pads;

a semiconductor substrate defining a substrate plane and having a central area and a peripheral area located between said central area and an edge of said substrate;

a plurality of electronic components formed into an integrated circuit within said central area;

a plurality of generally rectangular circuit bond pads, each having a center point, connected to said integrated circuit and being disposed at predetermined locations within said peripheral area, said predetermined locations being located along a pad axis extending parallel to said edge of said substrate, and each of said circuit bond pads having a bond pad width along said pad axis and being separated by a pad gap distance less than said bond pad width along said axis from a closest bond pad; and

a plurality of wires, each bonded to a predetermined circuit bond pad at a single pad bond area on said circuit bond pad and to a corresponding package bond pad, whereby each of said plurality of wires extends above a predetermined wire path in said substrate plane and has a predetermined wire to pad distance of closest approach in three dimensions to an adjacent second bond pad, characterized in that:

each circuit bond pad has a set of two pad bond areas comprising a first pad bond area and an alternative pad bond area, both of said first pad bond area and said alternative pad bond areas being located at predetermined non-central locations within said bond pad, an outer non-central location being located toward said edge of said substrate and an inner non-central location being located toward said central area and each of said plurality of wires is bonded to said predetermined circuit bond pad at one of said first pad bond area and alternative pad bond area;

each of said predetermined wire paths makes a predetermined wire path angle with said pad axis, thereby defining maximum and minimum wire path angles associated with predetermined maximum angle and minimum angle pads of said plurality of circuit bond pads; and

the wire path extending from said inner non-central location of a closest circuit bond pad adjacent to said minimum angle pad has a wire path to pad distance of closest approach that is greater than a predetermined wire path to pad tolerance.

4,959,707

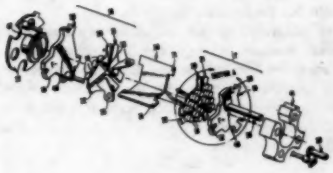
ROTATING RECTIFIER ASSEMBLY

Gordon A. Pinchott, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Apr. 14, 1989, Ser. No. 338,037

Int. Cl.[5] A01L *25/14, 25/06*

U.S. Cl. 357—76 **20 Claims**



1. A rotating rectifier assembly comprising:

a generally tubular housing;

at least one diode subassembly including at least one diode semiconductor device, a support means affixed to the at least one semiconductor device and at least one connector affixed to an opposite end of said at least one semiconductor device; and

means for axially positoining the at least one diode subassembly in the housing without compressively loading said at least one diode semiconductor device.

4,959,708

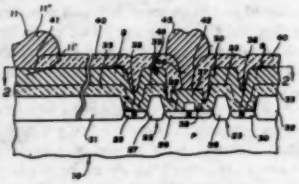
MOS INTEGRATED CIRCUIT WITH VERTICAL SHIELD

Mark F. Henderson, Kokomo, and Thomas H. Manderfield, Greentown, both of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Continuation-in-part of Ser. No. 240,159, Aug. 26, 1988, abandoned. This application Dec. 19, 1988, Ser. No. 286,110

Int. Cl.[5] H01L *29/06, 27/02, 27/10, 23/48*

U.S. Cl. 357—84 5 Claims



1. A MOS integrated circuit in which a plurality of MOS devices on a substrate are interconnected with each other and with signal, power and ground pads in first and second electric circuits adapted to process separate electric signals with a predetermined electric voltage applied across the power and ground pads and in which a dielectric passivation layer covers the integrated circuit to prevent the entry of ions from the external environment, the first and second electric circuits having signal carrying elements adjacent each other and the passivation layer such that high frequency signals tend to be coupled horizontally between the signal carrying elements through the passivation layer;

the MOS integrated circuit having a first metallization layer under the passivation layer including first portions of the signal, power and ground pads, ground lines from selected ones of the MOS devices to the first portion of the ground pad and a first metal member on the substrate between the signal carrying elements but electrically unconnected therefrom;

the MOS integrated circuit further having a second metallization layer above the passivation layer comprising second portions of the signal, power and ground pads connected to the respective first portions thereof through openings in the passivation layer and a second metal member extending downward through another opening in the passivation layer between the signal carrying elements to the first metal member and extending above the passivation layer and laterally substantially across the width of the signal carrying elements to prevent the horizontal capacitive coupling of the signal carrying elements through the passivation layer;

the MOS integrated circuit further having electrical ground connection means in one of the first and second metallization layers connecting the first and second metal members to the ground pad, whereby the first and second metal members comprise a grounded vertical shield between the signal carrying elements to prevent communication of signals therebetween.

4,959,709

SEMICONDUCTOR MEMORY DEVICE WITH CAPACITOR ON OPPOSITE SURFACE OF SUBSTRATE

Jinzo Watanabe, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 28, 1988, Ser. No. 276,596

Claims priority, application Japan, Dec. 2, 1987, 62-306135

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—23.6 8 Claims

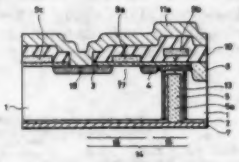
1. A semiconductor memory device comprising:

a semiconductor substrate having a main surface and a surface on the reverse side;

a MOSFET formed on the main surface of said semiconductor substrate; and

a storage capacity element formed on the surface of the reverse side of said semiconductor substrate,

said storage capacity element having one and another electrode,



said one electrode of said storage capacity element being connected to said MOSFET, and

said another electrode of said storage capacity element being formed on the surface of the reverse side of said semiconductor substrate.

4,959,710

ELECTRONIC ENDOSCOPE WHEREBY THE POSITION OF THE INSERTABLE PART CAN BE KNOWN BY A TRANSMITTED LIGHT OUTSIDE A BODY

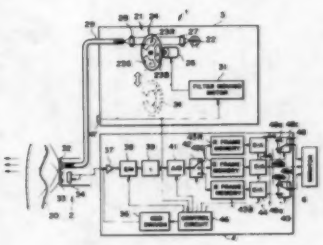
Masao Uehara; Masahide Kanno; Masahiko Sasaki; Katsuyoshi Sasagawa; Akinobu Uchikubo, all of Hachioji; Jun Hasegawa, Hino; Shinji Yamashita, Hachioji; Katsuyuki Saito, Hachioji, and Takehiro Nakagawa, Hachioji, all of Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Feb. 16, 1989, Ser. No. 311,541

Claims priority, application Japan, Mar. 1, 1988, 63-048361; Jul. 28, 1988, 63-188868; Feb. 8, 1989, 1-30643; Feb. 9, 1989, 1-31943

Int. Cl.[5] H04N *7/18*

U.S. Cl. 358—98 27 Claims



1. An electronic endoscope apparatus whereby, when a light emitted from an illuminating window provided in a tip part of an insertable part inserted into a body cavity is transmitted out of the body from within the body cavity, the position of said tip part will be confirmed from outside the body, comprising:

an imaging means for producing an image of an inspected part obtained from an observing window provided in the tip part of said insertable part, and for converting this image to an electric signal and outputting it;

an illuminating means for feeding an illuminating light to said imaging means and for adjusting the brightness of the illuminating light when a confirming signal directing the confirmation of the position of the tip part of said insertable part is input;

a signal processing means for processing the electric signal obtained from said imaging means, outputting a video signal which is an ordinary observing picture image signal

of a moving picture in case said confirming signal is not input and outputting a video signal which is a picture image signal different from said ordinary observing picture image signal in case said confirming signal is input; and

a displaying means for receiving said video signal output by said signal processing means and displaying the picture image of the inspected part.

4,959,711

METHOD AND APPARATUS FOR CORRECTING THE COLOR OF A PRINTED IMAGE

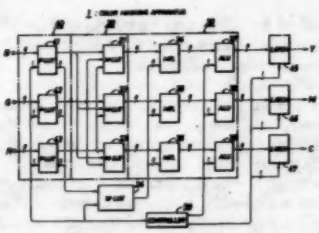
Po-Chieh Hung, and Tatsuya Kaneniwa, both of Hino, Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Dec. 24, 1987, Ser. No. 137,885

Claims priority, application Japan, Dec. 25, 1986, 61-314636; Apr. 10, 1987, 62-89004; Apr. 10, 1987, 62-89005; Apr. 10, 1987, 62-89006; Apr. 10, 1987, 62-89007; Apr. 10, 1987, 62-89008; Apr. 10, 1987, 62-89009; Jul. 8, 1987, 62-170357

Int. Cl.[5] H04N *1/46*

U.S. Cl. 358—80 16 Claims



1. A color image correction apparatus, comprising:

means for storing color data representative of a plurality of combinations of colors, each having a respective range of possible values for a designated mode of reproduction, each of said combinations being obtained by combining data selectively spaced within a respective one or respective ones of said ranges and representative of a respective one or respective ones of said colors, each of said combinations having an address corresponding to a respective point in another color system;

means for calculating color data of the type represented by said combinations from assumed points in said other color system not directly corresponding to any said address, including:

means for determining a plurality of addresses corresponding to a plurality of points arranged about each said assumed point;

means for interpolating among a plurality of the color data representative of combinations having the respective corresponding addresses, including means for avoiding changes in hue and means including stored weighting data for weighting the combinations of color data for purposes of interpolation.

4,959,712

METHOD AND APPARATUS FOR COLOR ADJUSTMENT

Toshiyuki Tsuzuki, and Masato Tobo, both of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Oct. 31, 1989, Ser. No. 429,285

Claims priority, application Japan, Nov. 1, 1988, 63-274542

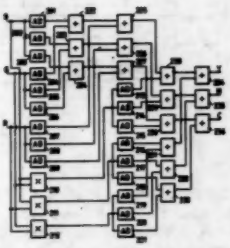
Int. Cl.[5] H04N *1/387, 1/40, 1/46*

U.S. Cl. 358—80 4 Claims

1. In a color image forming apparatus in which output signals of yellow, magenta and cyan are formed from color signals of blue, green, and red that are obtained by separating an image on an original, in forming the output signals, a matrix masking is performed in which said respective color signals are multiplied by color correction coefficients in a coefficient matrix, thereby to correct irregular absorption of color materials, color adjusting coefficients are added to said correction coefficients corresponding to the respective colors in said coefficients matrix, and coefficients so as to zero the sum of said color adjusting coefficients in each row of said matrix are subtracted from said color signals, thereby to keep a gray level unchanged, and the color materials are outputted on a recording medium in accordance with said output signals, a method for adjusting colors comprising the steps of:

adjusting a red color by obtaining a yellow signal and a magenta signal which are color adjusted through a multiplication of said blue and green color signals by a red color adjusting coefficient;

adjusting a green color by obtaining a yellow signal and a



cyan signal which are color adjusted through a multiplication of said blue and red color signals by a green color adjusting coefficient;

adjusting a blue color by obtaining a magenta signal and a cyan signal which are color adjusted through a multiplication of said green and red color signals by a blue color adjusting coefficient;

adjusting a yellow color by obtaining a yellow signal which is color adjusted through a multiplication of said blue color signals by yellow color adjusting coefficients;

adjusting a magenta color by obtaining a magenta signal which is color adjusted through a multiplication of said green color signals by magenta color adjusting coefficients; and

adjusting a cyan color by obtaining a cyan signal color which is adjusted through a multiplication of said red color signals by cyan color adjusting coefficients.

4,959,713

HOME AUTOMATION SYSTEM

Noriaki Morotomi; Yasumasa Endo; Yoshinori Enura; Nobuyoshi Asaka, all of Fujisawa, and Hideki Inoue, Kamakura, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Oct. 10, 1989, Ser. No. 418,631

Int. Cl.[5] H04N *7/18*

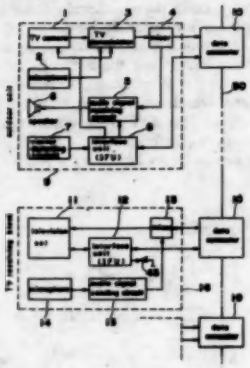
U.S. Cl. 358—108 17 Claims

1. A home automation system which reproduces on a television receiver in a TV receiver block inside the residence the voices from a voice collection circuit and the video images from a telephone camera provided in an entrance unit, and which comprises the entrance unit and the TV receiver block being connected with the entrance unit via a home bus laid throughout the residence in this system,

said entrance unit including a TV modulator which modulates the video signal from a TV camera and the audio signal from a voice collection circuit, an audio signal receiver which receives the audio signal transmitted over the home bus, a speaker to project the output signal from the audio signal receiver, an interface unit which commu-

nicates with other components in the system over the home bus to control said components, and a detection circuit which detects visitors; and

said television receiver block including a TV set with an external control terminal, an interface unit which is connected to the TV set and controls the TV set and communications between the TV set and other components via the home bus, a voice collection circuit, and an audio transmissions circuit which sends the output signal from the voice collection circuit over the home bus.

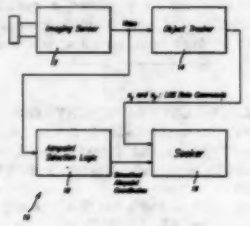


4,959,714

SEGMENTATION METHOD FOR TERMINAL AIMPOINT DETERMINATION ON MOVING OBJECTS AND APPARATUS THEREFOR

Thomas K. Lo, Temple City; Jack M. Sacks, Thousand Oaks, and Wayne P. Simoni, Canoga Park, all of Calif., assignors to Hughes Aircraft Company, Del.

Filed Aug. 8, 1988, Ser. No. 229,198
Int. Cl.[5] H04N 7/18, 7/00
U.S. Cl. 358—125 **10 Claims**



1. A method of detecting the spatial location of a moving object, said method comprising:

generating a track point for the object as it moves;

using the track point to continually aim a sensor at the object so that it is located in substantially the same spatial location in a plurality of image frames taken at different times whereby the object remains substantially in the same spatial position in each image frame while the background generally changes;

subtracting at least two of the image frames to generate a difference image in which pixels associated with the object will have values substantially less than those associated with the background;

applying a given threshold level to the difference image to generate a binarized signal; and

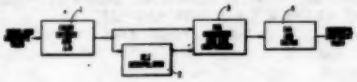
using the binarized signal to calculate an aimpoint which is more closely associated with the centroid of the object than the track point.

4,959,715

METHOD AND APPARATUS FOR CONVERTING AN INTERLACED TELEVISION TRANSMISSION TO A SEQUENTIAL DISPLAY USING MAXIMUM LIKELIHOOD ESTIMATION

Richard S. Prodan, Reston, Va., assignor to North American Philips Corporation, New York, N.Y.

Filed Jun. 16, 1989, Ser. No. 367,521
Int. Cl.[5] H04N 7/01
U.S. Cl. 358—140 **3 Claims**



1. A method for converting an interlaced television signal into a sequential television signal for display, said method comprising the steps of:

(a) digitally sampling said interlaced television signal to derive a first digital sample from a current interlaced line, a second digital sample from the previous interlaced line, and a third digital sample from the line of the previous field between the first and second samples;

(b) generating an interpolated line from said three digital samples using maximum likelihood estimation; and

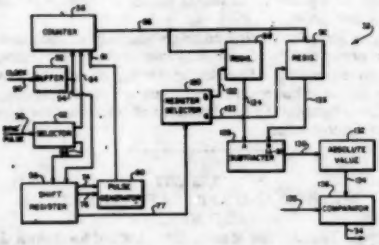
(c) generating a sequential television signal from said current interlaced line and said interpolated line.

4,959,716

T.V. INPUT SOURCE IDENTIFIER RESPONSIVE TO JITTER AND NOISE

Anthony R. Bugni; Larry G. Phillips; Ted A. Durby; Saiprasad V. Naimpally, all of Knoxville, and William S. Burdick, Strawberry Plain, all of Tenn., assignors to North American Philips Corporation, New York, N.Y.

Continuation of Ser. No. 239,089, Aug. 31, 1988, Pat. No. 4,905,083, Continuation-in-part of Ser. No. 119,603, Nov. 12, 1987. This application Nov. 14, 1989, Ser. No. 436,521
The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.
Int. Cl.[5] H04N 17/00, 5/04, 17/02
U.S. Cl. 358—139 **2 Claims**



1. An apparatus for analyzing a video signal containing a plurality of frames with each frame containing at least one field and each field having a time period and for determining whether the video signal is from a local video playing device or a broadcast signal source, comprising:

means for receiving the video signal and for generating timing data corresponding to the period of at least one selected field in each frame;

storage means for receiving the timing data and storing at least two numbers corresponding to the periods of the selected fields in two adjacent frames; and

judgment means for comparing the two numbers in the storage means and producing a local signal when the difference between the two numbers is greater than or equal to a predetermined threshold to indicate that the video signal is from a local video playing device and for generating a nonlocal signal when the difference is less than the predetermined threshold to indicate that the video signal is from a broadcast signal source.

4,959,717

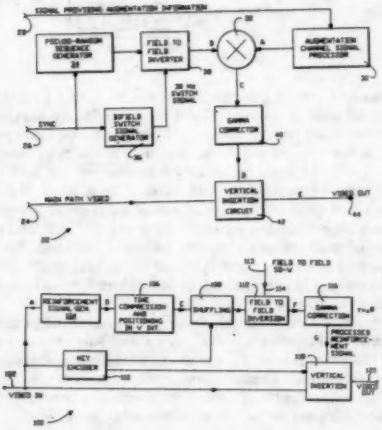
METHOD FOR MASKING PICTURE REINFORCEMENT SIGNALS CARRIED WITHIN THE VERTICAL INTERVAL

Yves C. Faroudja, 26595 Anacapa Dr., Los Altos, Calif. 94022

Continuation-in-part of Ser. No. 350,940, May 12, 1989, abandoned. This application Dec. 21, 1989, Ser. No. 454,369

Int. Cl.[5] H04N *7/087*

U.S. Cl. 358—147 32 Claims



1. A method for generating a visually masked reinforcement signal for transmission in scan lines within a vertical blanking interval of a predetermined television video signal, the method including the steps of:

randomizing the reinforcement signal in accordance with a predetermined key,

adding the randomized signal to be within the vertical blanking interval of the video signal to produce a combined signal, and

sending the combined signal through a television transmission path.

4,959,718

VIDEO DEVICE SYNCHRONIZATION SYSTEM

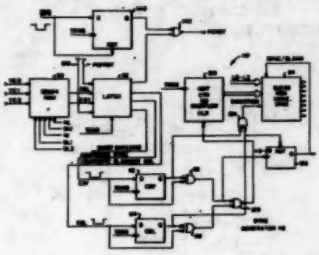
Phillip P. Bennett, Fremont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Division of Ser. No. 188,093, Apr. 27, 1988, Pat. No. 4,885,638, which is a continuation of Ser. No. 743,567, Jun. 17, 1985, abandoned, which is a division of Ser. No. 363,670, Mar. 31, 1982, Pat. No. 4,532,547. This application Nov. 14, 1989, Ser. No. 436,497

Int. Cl.[5] H04N *5/04*

U.S. Cl. 358—148 19 Claims

19. A method of generating a video synchronizing signal for combination with a video information signal and having a selected phase relative to a reference, comprising storing in a memory a multiplicity of digital values which are addressable in sets to provide respective sequences of signal magnitudes representing differently phased versions of the synchronizing



signal, providing a phase control signal which indicates the selected phase, and addressing the memory in response to the phase control signal to select a set of the digital values so as to provide the video synchronizing signal as constituted by the selected set of digital values.

4,959,719

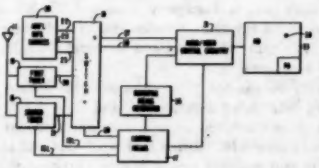
PICTURE-IN-PICTURE TELEVISION RECEIVER CONTROL

Hugo J. Strubbe, Yorktown Heights, N.Y., and Donald R. Gentner, Palo Alto, Calif., assignors to North American Philips Corporation, New York, N.Y.

Filed Dec. 21, 1988, Ser. No. 288,546

Int. Cl.[5] H04N *5/262*

U.S. Cl. 358—183 19 Claims

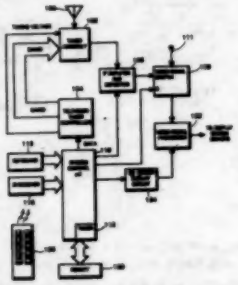


1. In combination with a picture-in-picture television receiver including a display means with a screen capable of displaying a main picture and at least one picture-in-picture, a plurality of sources of information for display as said main picture and said at least one picture-in-picture, a single manually operable control means for switching said main picture from one of said sources of information which it is capable of displaying to another such source and for switching said at least one picture-in-picture from one of said sources of information which it is capable of displaying to another such source, selection means for selecting whether said contro means switches said main picture or said predetermined one oi said at least one picture-in-picture between sources of information in response to manual operation and an indicating means generator responsive to said selection means causing said display means to display on said screen indicating means indicating which of said pictures said control means will switch between sources of information upon manual operation to cause such switching.

4,959,720
TUNER CONTROL APPARATUS HAVING TUNE-BY-LABEL CAPABILITY

David J. Duffield, Indianapolis, and Billy W. Beyers, Jr., Greenfield, both of Ind., assignors to RCA Licensing Corporation, Princeton, N.J.

Filed Apr. 6, 1989, Ser. No. 334,068
Int. Cl.[5] H04N 5/50, 5/44, 9/74
U.S. Cl. 358—191.1 8 Claims



1. A signal selection system, comprising:

an RF input terminal for receiving a plurality of RF signals;

tuning means coupled to said RF input terminal for selecting a particular RF signal from said plurality of RF signals in response to a tuner control signal;

means, coupled to said tuning means, for detecting said RF signal to produce a detected baseband video signal;

a baseband input terminal for receiving a second baseband video signal;

selection means having first and second input terminals for receiving said detected baseband video signal and said second baseband signal, respectively, said selection means selecting one of said baseband video signals at said first and second input terminals in response to a selection signal;

memory means for storing label data representative of labels comprising at least one alphabetical character, and tuning data associated with respective ones of said RF signals for tuning said RF signals, wherein one of said labels is associated with said baseband input terminal for selecting said baseband signal;

data entry means for generating said label data and said tuning data under user control; and

control means coupled to said data entry means and said memory means for storing said label data and said tuning data in said memory means during a programming mode, said control means also being coupled to said selection means, said control means retrieving said data from said memory means and generating said selection control signal for selecting one of said baseband video signals in response to label data input by a user.

4,959,721
REMOTE CONTROL SYSTEM WITH MENU DRIVEN FUNCTION SELECTION

Ljubomir Micic, Freiburg, and Peter M. Flamm, March-Buchheim, both of Fed. Rep. of Germany, assignors to Deutsche ITT Industries GmbH, Freiburg, Fed. Rep. of Germany

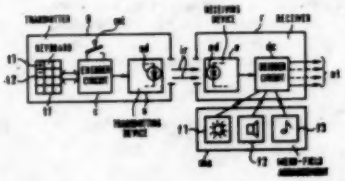
Filed Jul. 17, 1989, Ser. No. 380,401
Claims priority, application European Pat. Off., Aug. 6, 1988, 88112829[U]
Int. Cl.[5] H04N 5/44
U.S. Cl. 358—194.1 7 Claims

1. A remote control system comprising:

a remote control transmitter having a transmitting device that transmits remote control signals, an encoder circuit that controls the signals transmitted by said transmitting device, and manual control elements that control said encoder circuit; and

a remote control receiver having a receiving device that receives said remote control signals and a decoder circuit that decodes said received remote control signals, said remote control receiver further comprising a signal source that generates a positioning signal that is directed toward said remote control transmitter;

wherein said remote control transmitter comprises at least one menu key, which, when activated causes said encoder and said transmitting device to transmit a predetermined remote control signal to said remote control receiver to cause said remote control receiver to switch to a menu mode, said remote control receiver causing at least first and second menu fields to be displayed in said menu mode, said first and second fields being individually selectable in response to further remote control signals



from said remote control transmitter such that a selected one of said first and second menu fields is indicated visually, said remote control transmitter further comprising a position-sensing device having a plurality of sensing elements which are selectively activated by said positioning signal generated by said signal source when aligned with said positioning signal, said position-sensing device generating an output signal responsive to the activation of one of said sensing elements to cause said encoder to generate a remote control signal identifying said one of said sensing elements to select one of said first and second menu fields; and

wherein when said manual control elements of said remote control transmitter are activated while said remote control receiver is in said menu mode, a remote control signal is transmitted to said remote control receiver to cause said remote control receiver to generate a control command assigned to the visually indicated menu field.

4,959,722
IMAGE PICKUP DEVICE USING A PHOTO-TO-PHOTO CONVERSION ELEMENT

Itsuo Takanashi, Kamakura; Shintaro Nakagaki, Fujisawa; Hirohiko Shinonaga; Tsutou Asakura, both of Yokohama, and Masato Furuya, Yokosuka, all of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Continuation-in-part of Ser. No. 139,005, Dec. 29, 1987, Pat. No. 4,831,452. This application Jan. 24, 1989, Ser. No. 301,188
Claims priority, application Japan, Jan. 25, 1988, 63-13944
Int. Cl.[5] H04N 5/30
U.S. Cl. 358—211 3 Claims

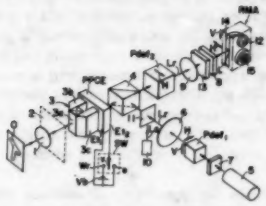
1. An image pickup device comprising:

a photo-to-photo conversion element comprising at least a photoconductive layer member, a dielectric mirror, and an optical modulation layer member which are disposed between two transparent electrodes;

a first image formation means for forming an optical image of an object on said photo-to-photo conversion element;

a second image formation means for scanning, in two directions substantially perpendicular to each other, optical image information corresponding to said optical image of said object using a light beam and for forming the light beam reading out said optical image information into a scanning light beam, a scanning locus of which on a plane becomes a line; and

recording medium transportation means for allowing a recording surface of a recording medium to be located on said plane where a linear image of said optical information



is formed, and for continuously moving said recording medium in a direction having an angle with respect to said line of the scanning locus.

4,959,723

SOLID STATE IMAGE PICKUP APPARATUS HAVING MULTI-PHASE SCANNING PULSE TO READ OUT ACCUMULATED SIGNAL

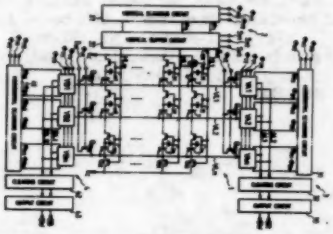
Seiji Hashimoto, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 2, 1988, Ser. No. 266,158

Claims priority, application Japan, Nov. 6, 1987, 62-279390; Dec. 21, 1987, 62-321423

Int. Cl.[5] H04N *3/14*

U.S. Cl. 358—213.11 **8 Claims**



1. A solid state image pickup apparatus comprising a plurality of photoelectric converting elements for accumulating optical information to be read out to the outside by multi-phase scanning pulses, wherein said multi-phase scanning pulses scan temporary accumulation capacitors to read out to the outside said optical information accumulated therein.

4,959,724

SOLID-STATE IMAGING APPARATUS AND METHOD OF DRIVING THE SAME

Kazuhiko Ueda, Yokohama, Japan, assignor to Victor Company of Japan, Ltd., Japan

Filed May 26, 1989, Ser. No. 357,498

Claims priority, application Japan, May 27, 1988, 63-129986

Int. Cl.[5] H04N *3/14*

U.S. Cl. 358—213.29 **2 Claims**

1. A solid-state imaging apparatus comprising:

photoelectric conversion elements arranged in columns and are further divided into rows of an A-field group and a B-field group corresponding to an A-field and a B-field of every frame of a video signal;

vertical transfer sections connected to the respective columns of the photoelectric conversion elements;

storage sections connected to the respective vertical transfer sections;

a horizontal transfer section connected to the storage sections;

a drain connected to the vertical transfer sections;

first means for transferring A-field signal charges from the A-field group of the photoelectric conversion elements to the vertical transfer sections;

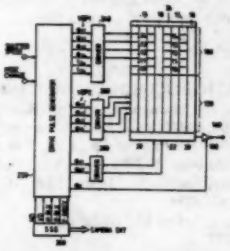
second means for, after the A-field signal charges are transferred to the vertical transfer sections by the first means, draining the A-field signal charges from the vertical transfer sections to the drain;

third means for, after the A-field signal charges are drained from the vertical transfer sections by the second means, transferring B-field signal charges from the B-field group of the photoelectric conversion elements to the vertical transfer sections;

fourth means for, after the B-field signal charges are transferred to the vertical transfer sections by the third means, draining the B-field signal charges from the vertical transfer sections to the drain;

fifth means for, during a first vertical blanking period of the video signal which starts after the B-field signal charges are drained from the vertical transfer sections by the fourth means, transferring A-field signal charges from the A-field group of the photoelectric conversion elements to the vertical transfer sections;

sixth means for, during the first vertical blanking period,



after the A-signal charges are transferred to the vertical transfer sections by the fifth means, transferring the A-field signal charges from the vertical transfer sections to the storage sections;

seventh means for, during the first vertical blanking period, after the A-signal charges are transferred to the storage sections by the sixth means, transferring B-field signal charges from the B-field group of the photoelectric conversion elements to the vertical transfer sections;

eighth means for, after the first vertical blanking period and before a second vertical blanking period of the video signal, transferring the A-field signal charges from the storage sections to the horizontal transfer section and outputting the A-field signal charges from the horizontal transfer section as an A-field portion of the video signal;

ninth means for, during the second vertical blanking period, transferring the B-field signal charges from the vertical transfer sections to the storage sections; and

tenth means for, after the second vertical blanking period and before a third vertical blanking period of the video signal, transferring the B-field signal charges from the storage sections to the horizontal transfer section and outputting the B-field signal charges from the horizontal transfer section as a B-field portion of the video signal.

4,959,725

METHOD AND APPARATUS FOR PROCESSING CAMERA AN IMAGE PRODUCED BY A VIDEO CAMERA TO CORRECT FOR UNDESIRED MOTION OF THE VIDEO CAMERA

Gary Mandle, Redwood City, Calif., assignor to Sony Corporation, Tokyo, Japan

Filed Jul. 13, 1988, Ser. No. 218,626

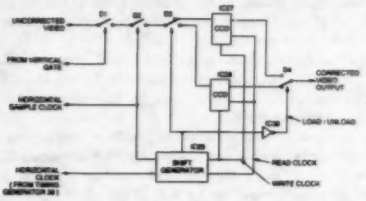
Int. Cl.[5] H04N *5/232*

U.S. Cl. 358—222 **28 Claims**

1. A system for processing an image generated by a video camera, including:

(a) an array of image sensing elements having dimensions larger than the image, wherein the array is oriented for exposure to the image so that undesired motion of the camera will cause undesired image motion relative to the array;

(b) a set of camera motion sensors attached to the camera, for generating camera motion signals indicative of the camera's motion in at least two dimensions; and



(c) a means for processing the camera motion signals to generate control signals for extracting from the array a stabilized array signal indicative of the image, wherein the stabilized array signal exhibits reduced undesired image motion due to undesired camera motion.

4,959,726

AUTOMATIC FOCUSING ADJUSTING DEVICE

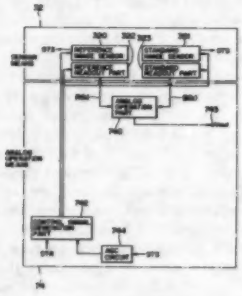
Takashi Miida; Jin Murayama, both of Kanagawa; Kazukiyo Tamada, Tokyo, and Takashi Kagechika, Omiya, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 9, 1989, Ser. No. 321,289

Claims priority, application Japan, Mar. 10, 1988, 6356874; Mar. 10, 1988, 6356875

Int. Cl.[5] B03B *3/00*

U.S. Cl. 358—227 **14 Claims**



1. An automatic focusing adjusting device capable of checking whether an image pickup optical system is in a focused state or not by detecting the relative positions of a pair of optical images of an object to be photographed as the distance measurement information, and, when the image pickup optical system is not in the focused state, driving the image pickup optical system in the direction of the optical axis thereof based on the detected relative positions until the image pickup optical system gets into the focused state so as to achieve the focusing of the image pickup optical system, said automatic focusing adjusting device comprising:

sensor means including a pair of sensors each having a light receiving part consisting of a plurality of photoelectric conversion elements arranged in a line manner, each of said photoelectric conversion elements forming a pixel, a storage part for storing the signal charges that are generated in said light receiving part for every pixel, a readout part for reading out the signal charges that are transferred from said storage part, and charge input preventive means for preventing the signal charges that are generated in said respective photoelectric conversion elements forming said light receiving part from flowing into said readout part, said sensor means being capable of photoelectrically converting said pair of object optical images by use of said pair of sensors and of outputting in a non-destructive manner an analog electric signal, which is generated by means of said photoelectric conversion and corresponds to one of said pair of optical images, and an analog electric signal, which is generated by means of said photoelectric conversion and corresponds to the other of said pair of optical images, while staggering said analog electric signals with respect to each other at a given cycle for every pixel;

operation means for specifying a distance measurement range in each of said light receiving parts of said sensor means; and,

control means responsive to said specification by said operation means for controlling said charge input preventive means in such a manner that only the signal charges that are stored in said photoelectric conversion elements but belong to one or more distance measurement ranges unnecessary for said distance measurement information in said light receiving parts are prevented from flowing into said readout parts.

4,959,727

IMAGE PICK-UP APPARATUS

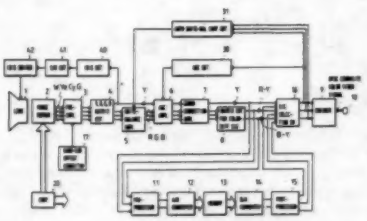
Takuya Imaide, Yokohama, and Toshiro Kinugasa, Hiratsuka, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 2, 1989, Ser. No. 360,408

Claims priority, application Japan, Jun. 3, 1988, 63-135488

Int. Cl.[5] H04N *5/238*

U.S. Cl. 358—228 **23 Claims**



1. An image pick up apparatus comprising:

an image sensor for converting a projected light image to an electrical signal;

signal level adjusting means for adjusting a level of signal read out from said image sensor;

a detector for detecting the level of signal read out from said image sensor and supplying an automatic level control signal based on the result of detection to said signal level adjusting means so as to keep the level of signal read out from said image sensor at a predetermined value;

exposure time setting means for setting an exposure time for said image sensor to either one of a normal exposure time and an exposure time longer than the normal exposure time; and

means for lowering a response speed of said signal level adjusting means to said automatic level control signal supplied from said detector, when said exposure time is set to a time longer than said normal exposure time, lower than the response speed preset when the exposure time is set to said normal exposure time.

4,959,728

INTERCHANGEABLE LENS AND INTERCHANGEABLE LENS SYSTEM

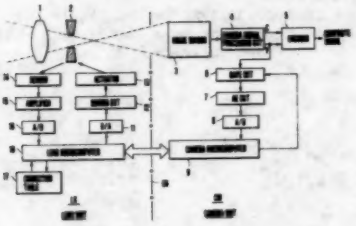
Koji Takahashi, Kanagawa; Susumi Kozuki, Tokyo; Hirokazu Mogi; Hideo Kawahara, both of Saitama; Hideyuki Arai, Kanagawa; Katsushi Suzuki, Tokyo; Toshiaki Mabuchi, Tokyo, and Takashi Kobayashi, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1989, Ser. No. 393,644

Claims priority, application Japan, Aug. 31, 1988, 63-216919; Sep. 27, 1988, 63-243078; Nov. 30, 1988, 63-304856; Jan. 13, 1989, 01-006510

Int. Cl.[5] H04N 5/238; G03B 7/095, 7/20

U.S. Cl. 358—228 12 Claims



1. An interchangeable lens comprising:

driving means controlled by data transmitted from a camera body to said lens, for displacing a controlled member of said lens;

detection means for detecting the displacement of said driving means; and

correction means for converting output characteristics of said detection means into predetermined common characteristics.

4,959,729

VIDEO CAMERA HAVING ROTATABLE VIEWFINDER

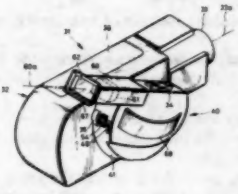
Hiroshi Fukuda; Hideo Miura, and Masahiko Mizuno, all of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 25, 1988, Ser. No. 275,889

Claims priority, application Japan, Nov. 25, 1987, 62-179461[U]

Int. Cl.[5] H04N 5/76, 5/225

U.S. Cl. 358—229 24 Claims



1. A portable video camera comprising:

a camera body having a lens and a device for producing a video image;

a handgrip to be grasped by a hand to hold said video camera body said handgrip being rotatably mounted on one side wall of said camera body; and

a view finder, structurally integral with said handgrip so as to be rotatable for viewing an object, wherein said view finder comprises means for rotatably positioning and releasably engaging said view finder in any of a plurality of positions so as to facilitate viewing through said view finder in said plurality of positions.

4,959,730

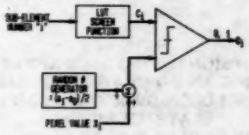
FALSE DENSITY CONTOUR SUPPRESSION USING RANDOMLY MODIFIED INPUT SIGNALS FOR COMPARISON TO THRESHOLD VALUES

Hwai T. Tai, Rochester, and Yee S. Ng, Fairport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 2, 1990, Ser. No. 459,496

Int. Cl.[5] H04N 1/23, 1/40

U.S. Cl. 358—298 5 Claims



1. Apparatus for suppressing false density contours in halftone reproduction of continuous tone original images, said apparatus comprising:

means for converting a continuous tone original image into a series of input signals whose values are representative of the gray level of successive picture elements of the original image;

means for printing groups of sub-elements sequentially organized into two dimensional matrix halftone cells, each halftone cell being associated with one of said input signals; and

means for assigning to each sequential sub-element of a halftone cell a weighted probability of being "ON" in accordance with the value of the associated input signal, wherein said assigning means is adapted to provide (1) a 50% probability print verses no-print rate for each sub-element at a respective predetermined picture element gray level, and (2) a uniform probability distribution on each side of said predetermined gray level from 0% to 100%.

4,959,731

COMBINED ELECTROGRAPHIC PRINTER, COPIER, AND TELEFAX MACHINE

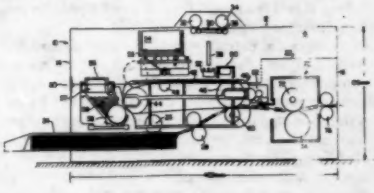
Kensuke Fukae, Monsey, N.Y., assignor to Kentek Information Systems, Inc., Allendale, N.J.

Continuation of Ser. No. 61,425, Jun. 9, 1987, Pat. No. 4,754,300. This application Jun. 27, 1988, Ser. No. 211,711

The portion of the term of this patent subsequent to Jun. 28, 2005, has been disclaimed.

Int. Cl.[5] H04N 1/10, 1/23; G03G 15/04

U.S. Cl. 358—300 24 Claims



1. An electrographic printing apparatus, comprising:

a housing,

a photoconductive member,

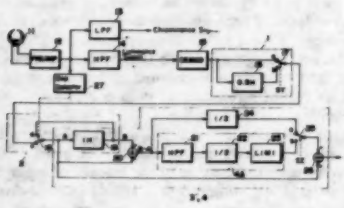
means for uniformly charging said photoconductive,
first and second means for selectively discharging said photoconductive member to produce a latent electrostatic image on said photoconductive member,
means for developing said latent electrostatic image, and
means for transferring the developed electrostatic image to copy material in a transfer zone,
a paper path operative to transport copy material from a source of copy material, through said transfer zone, and to an exit of said housing,
wherein said photoconductive member comprises a photoconductive belt horizontally disposed in said housing, said first and second selective discharge means are disposed above said photoconductive belt, and said transfer zone is located on a lower side of said photoconductive belt.

4,959,732

STILL VIDEO SIGNAL PLAYBACK APPARATUS FOR CONVERTING AN INPUT VIDEO SIGNAL INTO A NOISE CANCELLED, DROP-OUT COMPENSATED PLAYBACK SIGNAL

Akio Sato, and Kazuo Okada, both of Tokyo, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Nov. 29, 1988, Ser. No. 277,327
Claims priority, application Japan, Nov. 30, 1987, 62-300064
Int. Cl.[5] H04N 5/94
U.S. Cl. 358—336 **16 Claims**



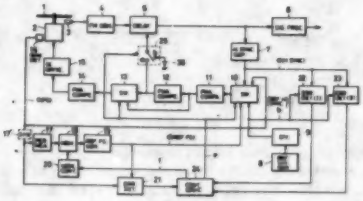
1. A still video signal playback apparatus for converting a video signal, recorded via field recording to frame recording, into a playback signal comprising:
drop-out detector means, coupled to the video signal, for outputting a drop-out detection signal when a drop-out is detected;
drop-out compensator means including
first switch means, coupled to the video signal, for providing a first switch output signal, and
1H delay means, wherein H refers to a horizontal scanning period, for delaying said first switch output signal by a period of 1H and for outputting a first delayed signal,
said first switch means outputting as said first switch output signal said first delayed signal in response to said drop-out detection signal and the video signal otherwise; and noise cancellation means including
first arithmetic means for subtracting said first switch output signal from said first delayed signal to output a first difference signal,
noise component extract means, coupled to said first difference signal, for extracting and outputting a noise component signal from said first difference signal,
attenuator means, coupled to and attenuating said first difference signal and said noise component signal according to a predetermined ratio, to output an attenuated first difference signal,
second switch means, coupled to and selectively outputting as a second switch output signal, said attenuated first difference signal or said attenuated noise component signal based on whether the video signal was recorded via field recording or frame recording, and
second arithmetic means, coupled to and adding said first switch output signal and said second switch output signal to output the playback signal.

4,959,733

MOTOR ROTATION CONTROL APPARATUS WITH MOTOR ROTATIONAL FREQUENCY MEMORY

Yoshio Miura; Motoyuki Suzuki; Akio Fukushima, and Yonemitu Mori, all of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 16, 1988, Ser. No. 194,303
Claims priority, application Japan, May 18, 1987, 62-118770
Int. Cl.[5] H04N 5/76
U.S. Cl. 358—338 **20 Claims**



1. An apparatus for controlling the rotation of a motor to rotate a recording medium where an information signal and synchronizing signal are recorded, comprising:
means for reproducing the information signal and the synchronizing signal recorded on said recording medium;
synchronizing signal separating means connected to said reproducing means for separating the synchronizing signal from the reproduced signal;
means for generating a reference synchronizing signal;
means for generating a phase error signal by phase-comparing the synchronizing signal from said separating means with the reference synchronizing signal from said signal generating means;
means for controlling the rotation of the motor in such a manner as to eliminate the phase error in accordance with the phase error signal obtained from said phase error signal generating means;
means for detecting the rpm or rotational frequency of said motor;
memory means for sequentially storing the data relative to the rotational frequency obtained from said detecting means;
means for generating a reference frequency signal on the basis of the rotational frequency data stored in said memory means; and
first detecting means for detecting the phase error between the synchronizing signal separated by said synchronizing signal separating means and the reference synchronizing signal generated from said reference synchronizing signal generating means;
wherein, when said phase error is greater than a predetermined value on the basis of the output signal of said first detecting means, the rotational frequency detected by said rpm detecting means is phase-compared with the reference frequency signal produced from said reference frequency signal generating means, and the phase error signal thus obtained is fed to said motor rotation control means for uniformly charging said photoconductive member,

4,959,734

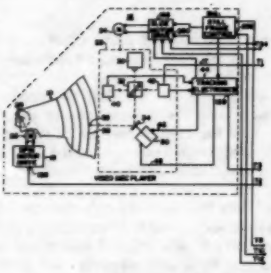
PRESTORED RESPONSE PROCESSING SYSTEM FOR BRANCHING CONTROL OF INTERACTIVE VIDEO DISC SYSTEMS

Richard W. Foster, Huntsville, Ala., assignor to Interactive Video Disc Systems, Inc., Huntsville, Ala.

Continuation of Ser. No. 30,453, Mar. 25, 1987, abandoned, which is a continuation of Ser. No. 692,654, Jan. 16, 1985, abandoned, which is a continuation-in-part of Ser. No. 311,939, Oct. 16, 1981, abandoned, which is a continuation of Ser. No. 29,282, Apr. 11, 1979, abandoned, which is a continuation-in-part of Ser. No. 18,583, Mar. 8, 1979, abandoned. This application Jan. 6, 1989, Ser. No. 294,767

Int. Cl.[5] H04N 5/76

U.S. Cl. 358—341 8 Claims



1. The method of production and reproduction of a recording comprising the steps of:

(A) recording on a recording medium a plurality of spaced segments wherein at least one of said segments includes a combination of video and audio signals, and generally co-located with said video and audio signals there is a series of sequentially recorded, digitally encoded, signals, and wherein said last-named signals comprise sets of two signals, a first signal representative of a selected response or answer, and a second signal designative of a separate and remote location on said recording medium;

(B) reproducing at least video and audio signals from at least a part of one of said segments of said recording medium on a digitally controlled positionable playback device and then displaying a still frame of said segment;

(C) generating a signal external to said recording medium, which signal is of the character of said first, response or answer, signal, and storing the generated signal;

(D) utilizing the externally generated, stored signal to direct reproduction from selected locations on said recording medium, this time reproducing a series of said sets of said two signals;

(E) during reproduction of step (D), comparing said externally generated signal with a series of said first response signals from said recording medium;

(F) upon there occurring a selected correlation with a particular said first signal during step (E), obtaining, as an output, a said second location signal; and

(G) controlling said playback device to locate and reproduce from a said segment of said recording medium identified by said second location signal identified by step (F).

4,959,735

RECORDING APPARATUS WITH REMAINING TIME INDICATION DISPLAY

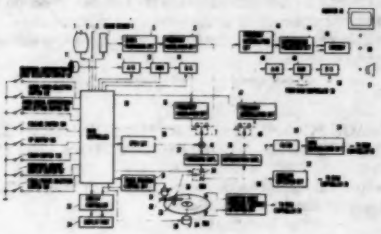
Hisashi Kawai, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 159,232, Feb. 23, 1988, abandoned. This application Nov. 7, 1989, Ser. No. 432,567

Claims priority, application Japan, Feb. 24, 1987, 62-041863

Int. Cl.[5] H04M 5/76

U.S. Cl. 358—342 25 Claims



1. A recording apparatus having selectable modes of recording in storing means, including a first mode of recording at least sound or audio information and a second mode of recording information other than said audio information, comprising:

(a) detecting means for detecting an amount of unrecorded part in said storing means for recording; and

(b) control means for varying the mode of displaying the amount of unrecorded part in said storing means in accordance with a selection made between said first and second recording modes.

4,959,736

IMAGE SIGNAL PROCESSING METHOD AND APPARATUS WITH ELONGATED PICTURE ELEMENTS

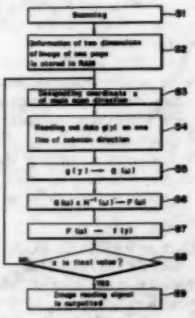
Masayuki Mino, and Osamu Yamada, both of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Dec. 29, 1988, Ser. No. 291,565

Claims priority, application Japan, Dec. 29, 1987, 62-334025; Jul. 8, 1988, 63-171637

Int. Cl.[5] H04M 1/40

U.S. Cl. 358—471 11 Claims



1. An image signal processing method for an image reader which reads an image of a document by scanning the document with the use of a CCD linear image sensor, wherein CCD picture elements are aligned in a main scan direction, each of which has a photosensitive area elongated in a subscan direc-

tion perpendicular to the main scan direction, comprising the following steps:

converting an analog signal outputted from each of said CCD picture elements of said CCD linear image sensor to a digital signal;

Fourier-transforming the digital signal;

multiplying the value obtained by Fourier-transformation by an inverse of a function representing a frequency characteristic of said CCD picture element or an approximate function of said inverse function, said frequency characteristic depending on the length of the photosensitive area of the CCD picture element in the subscan direction and a spatial frequency N in the subscan direction; and

obtaining an image data by Fourier-inverse-transforming the obtained product.

4,959,737

IMAGE SCANNING APPARATUS FOR USE IN AN IMAGE READER, A COPYING MACHINE AND THE LIKE

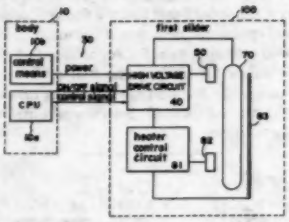
Munehiro Nakatani, Osaka, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jun. 9, 1988, Ser. No. 204,678

Claims priority, application Japan, Dec. 6, 1987, 62-147477

Int. Cl.[5] H04N *1/04*

U.S. Cl. 358—475 **17 Claims**



1. An image scanning apparatus comprising:

a body member;

a platen provided on the body member of the image scanning apparatus for placing a document thereon;

a light source for illuminating the surface of the document;

holding means for holding said light source thereon and movable along the platen within the body member of the image scanning apparatus for scanning the document;

power control means provided in the body member of the image scanning apparatus;

drive means for generating a high voltage which is applied to the light source to turn on the same and is provided on said holding means for integral movement therewith, the drive means being supplied with electrical power by the power control means, and

a power supply line interconnecting the power control means and the drive means.

4,959,738

METHOD AND APPARATUS FOR DRIVING A STEPPING MOTOR

Hiroshi Fujii, and Shinji Katsuki, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Mar. 20, 1989, Ser. No. 325,978

Claims priority, application Japan, Mar. 29, 1988, 63-75518

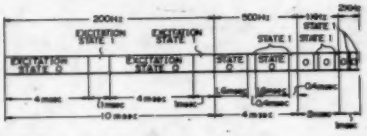
Int. Cl.[5] G11B *5/58*; H02K *29/04*

U.S. Cl. 360—78.13 **21 Claims**

1. A method of driving a stepping motor having a driven member and a plurality of phases to which input pulses are applied in predetermined sequences for establishing excitation states by which the driven member is stepped to respective positions, said method comprising the steps of:

alternating between first and second of said excitation states corresponding to respective stepped positions which are adjacent each other and between which it is desired to bring said driven member to rest, the alternation between said first and second excitation states being initially effected at a frequency at which said driven member is made to oscillate between said stepped positions corresponding to said first and second excitation states, respectively;

gradually increasing said frequency of alternation between said first and second excitation states to a value at which said driven member no longer oscillates with said alternation and comes to rest at a position between said stepped positions corresponding to said first and second excitation states, respectively;



selecting a duty ratio for said first and second excitation states which inversely corresponds to the ratio of the distances from the desired position of rest of said driven member to said stepped positions of the latter corresponding to said first and second excitation states, respectively; and

applying said duty ratio to said alternation between said first and second excitation states at least during said increasing of the frequency to said value at which said driven member no longer oscillates, whereby said driven member comes to rest at said desired position thereof.

4,959,739

MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS HAVING TAPE LOADING AND UNLOADING MECHANISM

Kazumasa Tsutsumi, and Shinji Ohba, both of Hamamatsu, Japan, assignors to Yamaha Corporation, Shizuoka, Japan

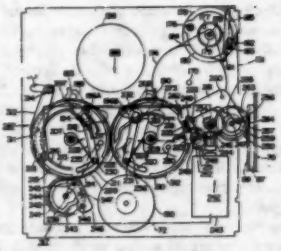
Division of Ser. No. 153,338, Feb. 8, 1988, Pat. No. 4,868,693.

This application Apr. 12, 1989, Ser. No. 336,894

Claims priority, application Japan, Feb. 9, 1987, 62-27833; Mar. 19, 1987, 62-65323; Sep. 10, 1987, 62-138754

Int. Cl.[5] G11B *5/008*

U.S. Cl. 360—95 **6 Claims**



1. A magnetic recording and/or reproducing apparatus for use with a tape cassette having accommodated therein a magnetic tape, said apparatus comprising:

a head drum having mounted thereon at least one magnetic head;

first and second tape loading post means movable between their respective tape unloading positions where said first

and second tape loading post means are located within said tape cassette and respective tape loading positions where said first and second tape loading post means are located remote from said tape cassette, said first and second tape loading post means drawing a portion of the magnetic tape out of said tape cassette when said first and second tape loading post means move from their respective tape unloading positions to their respective tape loading positions, the magnetic tape portion being wrapped about said head drum by a predetermined wrapping angle when said first and second tape loading post means move to their respective tape loading positions;

first and second drive gear means in mesh with each other, said first drive gear means being angularly movable about its axis in tape loading and unloading directions opposite to each other, and said second drive gear means being angularly movable about its axis in tape loading and unloading directions opposite to each other;

means for driving said first and second drive gear means to angularly move them about their respective axes in said tape loading and unloading directions;

first and second linkage means having their respective one ends connected respectively to said first and second tape loading post means, said first linkage means extending between said first tape loading post means and said first drive gear means for transmitting angular movement of said first drive gear means for transmitting angular movement of said first drive gear means to said first tape loading post means to move the same between its tape unloading and loading positions, said second linkage means extending between said second tape loading post means and said second drive gear means for transmitting angular movement of said second drive gear means to said tape loading post means to move the same between its tape unloading and loading positions; and

first and second lost-motion means through which the other ends of the respective first and second linkage means are connected respectfully to said first and second drive gear means, said first and second lost-motion means comprising an arcuate slot formed in a corresponding one of said first and second drive gear means, said arcuate slot extending circumferentially about the axis of the corresponding drive gear means, a pin fitted in said arcuate slot for movement therealong and mounted to the other end of a corresponding one of said first and second linkage means, and biasing means associated with said pin for biasing the same in such a direction as to move a corresponding one of said first and second tape loading post means toward its tape loading position;

wherein said first lost-motion means enables angular movement of said first drive gear means in its tape loading direction to be transmitted to said first tape loading post means through said first linkage means until said first tape loading post means moves to its tape loading position, while said first lost-motion means prevents subsequent angular movement of said first drive gear means in its tape loading direction after movement of said first tape loading post means to its tape loading position, from being transmitted to said first tape loading post means through said first linkage means, and

wherein said second lost-motion means enables angular movement of said second drive gear means in its tape loading direction to be transmitted to said second tape loading post means through said second linkage means until said second tape loading post means moves to its tape loading position, while said second lost-motion means prevents subsequent angular movement of said second drive gear means in its tape loading direction after movement of said second tape loading post means to its tape loading position, from being transmitted to said second tape loading post means through said second linkage means.

4,959,740

DISC RECORDING AND/OR REPRODUCING APPARATUS INCLUDING MEANS FOR MINIMIZING THE EFFECTS OF TEMPERATURE CHANGES

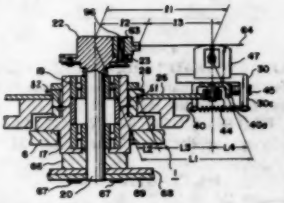
Tatsuo Nishikawa, Tachikawa, Japan, assignor to Canon Denshi Kabushiki Kaisha, Chichibu, Japan

Continuation of Ser. No. 328,734, Feb. 8, 1989, abandoned, which is a continuation of Ser. No. 207,011, Jun. 5, 1988, abandoned, which is a continuation of Ser. No. 673,156, Nov. 19, 1989, abandoned. This application Sep. 19, 1984, Ser. No. 409,985

Claims priority, application Japan, Nov. 18, 1983, 58-215961; Nov. 18, 1983, 58-215967; Nov. 18, 1983, 58-215968; Nov. 18, 1983, 58-215973; Nov. 18, 1983, 58-215974

Int. Cl.[5] **G11B** *5/52, 21/04, 5/012, 17/00*

U.S. Cl. 360—106 **18 Claims**



12. A disc recording and/or reproducing apparatus comprising:

a recording and/or reproducing head for recording and/or reproducing information on and/or from a disc-shaped recording medium;

a rotary shaft for rotating said disc-shaped recording medium;

a cam member rotatable around said rotary shaft without preventing the rotation of said rotary shaft, said cam member having radii which are centered on said rotary shaft and varied to form a spiral surface of said cam member;

a head carriage having an engaging portion for engaging with said cam surface and on which said recording and/or reproducing head is mounted, said head carriage displacing said recording and/or reproducing head with respect to said disc-shaped recording medium in response to the rotation of said cam; and

a head adjusting member disposed on said head carriage for adjusting the position of said recording and/or reproducing head on said head carriage, said head adjusting member being capable of adjusting the position of said recording and/or reproducing head in the radial direction of said disc-shaped recording medium, and a gradient of said recording and/or reproducing head in the direction of a tangent to said disc-shaped recording medium.

4,959,741

MAGNETIC HEAD WITH A CONTROLLED GAP WIDTH

Hiroyuki Ota, and Kazuhiko Sato, both of Saitama, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Feb. 16, 1988, Ser. No. 155,947

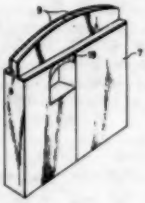
Claims priority, application Japan, Feb. 16, 1987, 62-31527

Int. Cl.[5] **G11B** *5/22*

U.S. Cl. 360—122 **3 Claims**

1. A magnetic head comprising a pair of magnetic cores, a gap-forming film joining said pair of magnetic cores which form a magnetic gap, both lateral sides of said gap being flat

except for a surface adapted to be in sliding contact with magnetic tape, said surface having the same width as a track width,



each of said flat sides being coated with a nonmagnetic thin hard film.

4,959,742

ROTARY HEAD MOUNTING DEVICE

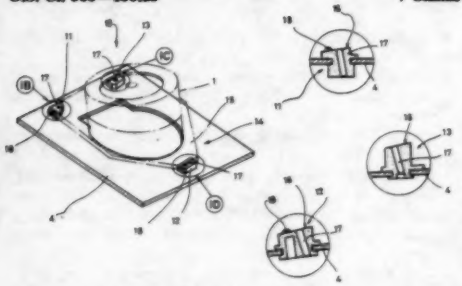
Kazumasu Tsutsumi, Hamamatsu, Japan, assignor to Yamaha Corporation, Hamamatsu, Japan

Filed Sep. 8, 1988, Ser. No. 242,142

Claims priority, application Japan, Sep. 11, 1987, 62-139059[U]

Int. Cl.[5] G11B *15/60*

U.S. Cl. 360—130.23 **7 Claims**



1. A rotary head mounting device for mounting a rotary head obliquely with respect to a primary surface of a chassis such that a rotational axis of the rotary head is oblique to the primary surface of the chassis, comprising at least one oblique base molded on the chassis, each oblique base having a mounting surface which is oblique to the primary surface of the chassis for mounting a rotary head thereon and a mounting hole for receiving a fastener for fixing the rotary head to the mounting surface of the oblique base, wherein the mounting hole extends from the mounting surface of the oblique base into the oblique base, the central axis of the mounting hole being substantially perpendicular to the mounting surface of the oblique base, and wherein a mounting portion of the rotary head is fixedly mounted to the mounting surface of each oblique base by providing a fastener through the mounting portion of the rotary head and the corresponding mounting hole in each oblique base.

6. A method for making a mounting device for mounting a rotary head such that a rotational axis of the rotary head is oblique to a primary surface of a chassis, wherein the mounting device comprises at least one base having a mounting surface oblique to the primary surface of the chassis and a corresponding mounting hole such that when a mounting portion of the rotary head is mounted to the oblique mounting surface of the base by way of a fastener inserted through the mounting portion of the rotary head and the mounting hole of the base, the rotational axis of the rotary head is oblique to the primary surface of the chassis, the method comprising the sequential steps of:

providing a chassis having a primary surface;

molding a base on the primary surface of the chassis such that the base is fixedly attached to the primary surface of the chassis, the base being molded so as to have a mounting surface oblique to the primary surface of the chassis and a mounting hole extending from the mounting surface of the base into the base, the central axis of the mounting hole being substantially perpendicular to the mounting surface of the base.

4,959,743

JITTER REDUCING TAPERED ROTARY DRUM FOR MAGNETIC HEAD APPARATUS

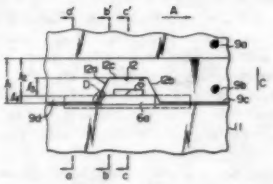
Mashanori Kochi, Katsuta; Juichi Morikawa, Katsuta; Makoto Ibe, Katsuta; Shinji Ozaki, Funabashi, and Hitoshi Takizawa, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 15, 1988, Ser. No. 219,268

Claims priority, application Japan, Jul. 24, 1987, 62-183406

Int. Cl.[5] G11B *15/61*

U.S. Cl. 360—130.24 **4 Claims**



1. A rotary magnetic head drum apparatus comprising at least one video head, a rotary drum having an axis of rotation, a tape running surface and a head mounting surface to which said video head is securely mounted, and a stationary drum provided with a tape guide and a tape running surface, wherein said tape running surface of said rotary drum has an upper portion extending parallel to the axis of rotation of the rotary drum and a lower end portion whose diameter becomes gradually smaller along the axis of rotation of said rotary drum, said lower end portion being projected such that a bottom end surface thereof is located below a plane of said head mounting surface of said rotary drum, said lower end portion having at least one window through which a part of said video head is exposed, wherein a lower end of said lower end portion of said rotary drum and an upper end of said tape running surface of said stationary drum have chamfered edges.

4,959,744

SHUTTER ASSEMBLED DISC CARTRIDGE

Yasunori Kanazawa, Hachioji; Yoshiyuki Nakamori, Ibaragi; Tadahiro Kuwa, Ibaragi; Nobuyuki Fujimoto, Odawara, and Shinichi Abe, Kanagawa, all of Japan, assignors to Hitachi Maxell, Ltd. and Hitachi, Ltd., both of Osaka, Japan

Division of Ser. No. 13,051, Feb. 10, 1987, Pat. No. 4,811,151, which is a continuation of Ser. No. 642,508, Aug. 20, 1984, abandoned. This application Sep. 1, 1988, Ser. No. 239,756

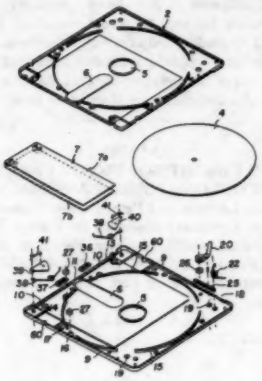
Claims priority, application Japan, Aug. 20, 1983, 58-150963; Aug. 27, 1983, 58-155723

Int. Cl.[5] G11B *23/02, 5/012*

U.S. Cl. 360—133 **4 Claims**

1. A disc cartridge comprising a disc case formed by a top half and a bottom half each having a spindle hole and a head insertion hole provided therein, said disc case defining a disc chamber bounded by peripheral walls of said respective top half and bottom half, a recording disc rotatably enclosed in said disc chamber of said disc case, shutter means for closing and opening said spindle holes and head insertion holes, and three guide rollers rotatably arranged in one of said top half or bottom half of said disc case disposed in such a manner so as to define an imaginary isosceles triangle within said chamber,

with each of said rollers being located at a corner of said triangle, said three guide rollers being engageable with a peripheral edge of said recording disc for supporting said record-



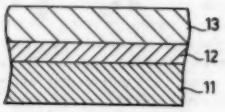
ing disc when said recording disc cartridge is not in use, and wherein one of said three guide rollers is releasable from said peripheral edge of said recording disc when said recording disc cartridge is in use.

4,959,745

CAPACITOR AND METHOD FOR PRODUCING THE SAME

Kyoichi Suguro, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 6, 1989, Ser. No. 319,342
Claims priority, application Japan, Mar. 4, 1988, 63-049736
Int. Cl.[5] H01G 7/00, 9/00
U.S. Cl. 361—311 **6 Claims**



1. A capacitor comprising:
a dielectric film of a metal oxide; and
two electrodes contacting with surfaces of the dielectric film, wherein at least one of the electrodes comprises a conductive metal compound having a sufficient amount of added oxygen so as to reduce leakage current resistivity of said conductive metal compound to less than 1000 ohms-/cm, to reduce a crystal size of the electrode and to smooth surfaces of said electrodes contacting said dielectric film to restrict electric field concentration effect.

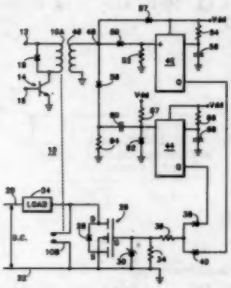
4,959,746

RELAY CONTACT PROTECTIVE CIRCUIT

Chester C. Hoegel, Brush Prairie, Wash., assignor to Electronic Specialty Corporation, Vancouver, Wash.

Continuation-in-part of Ser. No. 9,236, Jan. 30, 1987. This application Aug. 29, 1988, Ser. No. 237,547
Int. Cl.[5] H02H 7/22
U.S. Cl. 361—13 **29 Claims**

1. A contact protective circuit for a relay including a pair of contacts and an operating coil for changing the circuit-completing status of said contacts between an open circuit and a closed circuit condition, comprising:
means for detecting a transient in said operating coil pursuant to a change in the energization of said operating coil prior to the resulting change in circuit-completing status of said contacts,
a field effect transistor having a drain terminal, a source terminal and a gate terminal,
means connecting said drain terminal and said source terminal respectively to contacts of said pair, and



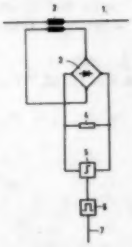
timing means responsive to said detecting means and coupled to said gate terminal of said field effect transistor for gating said field effect transistor to an on condition, shunting current around said contacts, starting at least as soon as the beginning of said change in circuit-completing status of said contacts.

4,959,747

CIRCUIT ARRANGEMENT FOR CURRENT LIMITING

Thomas Koelpin, Amberg, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Mar. 28, 1986, Ser. No. 845,907
Int. Cl.[5] H02H 7/08
U.S. Cl. 361—31 **4 Claims**



1. In a.c. machines having phase gating current control by solid state devices in which a smooth start of the a.c. machine is provided by arresting a steady decrease in the ignition angle of the solid state devices upon the occurrence of a predetermined limiting current value, an improved current limiting circuit comprising:
one phase load current measurement means including a circuit measuring an instantaneous limiting value of the magnitude of the load current and having an output signal; and
means responsive to said output signal including a circuit providing a control signal to said solid state devices to arrest the decrease of the ignition angle of said solid state devices, wherein the means providing the control signal comprises a retriggerable monostable element.

4,959,748

FILM CAPACITOR, METHOD OF AND APPARATUS FOR MANUFACTURING THE SAME

Tadashi Kimura, Yawata; Tanejiro Ikeda, Nara; Hisaaki Tachihara, and Kunio Oshima, both of Matsue, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Mar. 27, 1989, Ser. No. 329,351
Claims priority, application Japan, Mar. 30, 1988, 63-76797
Int. Cl.[5] H01G 4/08, 1/14, 4/06
U.S. Cl. 361—323 20 Claims

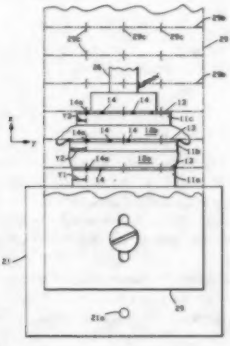
18. A film capacitor comprising: a plurality of superposed laminations having two electrodes lead-out sides, each of said laminations comprising a dielectric film and an electrode layer formed on said dielectric film, said electrode layer having marginal sections which project from said first dielectric film on both said electrode lead-out sides; and end surface electrodes formed on both said electrode lead-out sides such that said marginal sections of said electrode layer are embedded in said end surface electrodes, said dielectric films having first and second ends which are disposed respectively on both said electrode lead-out sides, said first ends being non-aligned with each other and said second ends being non-aligned with each other respectively on said electrode lead-out sides so as to enhance electrical connection and binding strength between said electrode layer and said end surface electrodes.

4,959,749

LAYERED ELECTRONIC ASSEMBLY HAVING COMPENSATION FOR CHIPS OF DIFFERENT THICKNESS AND DIFFERENT I/O LEAD OFFSETS

John E. Dzarnoski, Jr., Poway, and James W. Babcock, Escondido, both of Calif., assignors to Unisys Corporation, Blue Bell, Pa.

Filed Aug. 16, 1989, Ser. No. 395,236
Int. Cl.[5] H05K 7/00
U.S. Cl. 361—396 12 Claims



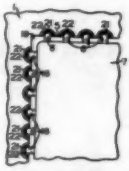
1. A layered electronic assembly that is comprised of: a plurality of integrated circuit chips which are arranged in a stack, respective adhesive layers which interleave the chips and hold them together, and I/O leads on said chips which extend to one face of said stack; wherein said chips have respective thicknesses which vary from chip to chip, and said I/O leads are offset from one edge of the chip on which they lie by respective distances which vary from chip to chip; and wherein said adhesive layers have respective thicknesses which compensate for said thickness variations in said chips such that said I/O leads on adjacent chips are spaced by predetermined distances along said stack face, and said one edge on said chips are out of line relative to one another such that said I/O leads on adjacent chips are aligned on said stack face.

4,959,750

PRINTED CIRCUIT BOARD FOR CARRYING A MIXED-COMPONENT ASSEMBLY

Henner Cuyrim, Laatzen, and Peter Felsen, Wennigsen, both of Fed. Rep. of Germany, assignors to Wabco Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Filed Jun. 21, 1988, Ser. No. 209,658
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720925
Int. Cl.[5] H05K 1/18
U.S. Cl. 361—401 3 Claims



1. A printed circuit board manufactured of insulated carrier material having a plurality of conductive tracks comprising, indentations formed by bore holes for guiding a surface-mounted component into a recess, the recess is provided with the dimensions which approximately correspond to the peripheral surface of the surface-mounted component to be inserted, into said recess and a side wall of the recess is provided with a plurality of said indentations each having a contact surface with solder disposed thereon for being electrically connected to each of the plurality of conductive tracks for providing electrical connections to wire leads of the surface-mounted component and wherein the indentations automatically guide the wire leads to cause the exact positioning of the surface-mounted component in the printed cicuit board.

4,959,751

CERAMIC HYBRID INTEGRATED CIRCUIT HAVING SURFACE MOUNT DEVICE SOLDER STRESS REDUCTION

John A. Hearn; Dwight L. Schwarz, both of Kokomo; Dwadasi H. R. Sarma, West Lafayette, and Ponnusamy Palanisamy, Kokomo, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

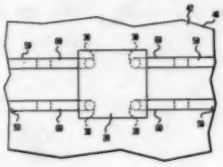
Continuation-in-part of Ser. No. 232,743, Aug. 16, 1988. This application Jan. 17, 1989, Ser. No. 297,212
Int. Cl.[5] H01R 9/00; H05K 7/20
U.S. Cl. 361—406 4 Claims

1. An assembly comprising: a ceramic support member having a top surface for receiving and supporting a semiconductor chip, said top surface of said ceramic support member also having contact areas thereon;

a semiconductor chip having external contacts for electrical interconnection to the contact areas on said ceramic support member; and

a plurality of first conductor means, each being supported on the ceramic support member and having first and second ends and an intermediate portion, the first end of a respective conductor means being securely and conductively

connected by solder to a respective one of said external contacts of the chip, the second end being securely and conductively connected without solder to one of said contact areas of said ceramic support member, respectively; and



the intermediate portion and the first end of each of said first conductor means being controllably adherent to the top surface of the support member, effective to prevent buildup of stress in solder at said a respective external contact due to a difference in thermal expansion characteristics between said solder and said ceramic support member.

4,959,752

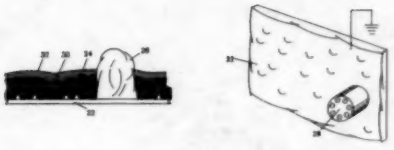
ELECTRONIC MODULE RFI/EMI SHIELDING

Victor M. Samarov, Carlisle; George A. Doumani, Jr., North Andover, both of Mass., and Philip F. Becker, Bedford, N.H., assignors to Digital Equipment Corporation, Maynard, Mass.

Filed Oct. 24, 1988, Ser. No. 262,436

Int. Cl.[5] H05K *9/00*

U.S. Cl. 361—424 **25 Claims**



1. The method of RFI/EMI shielding an individual module of an electronic assembly comprising the steps of:

(a) applying a substantially continuous, conformal, electrically insulating material to predetermined surfaces of the module to a thickness to reliably cover protruding features of electronic components carried on the module;

(b) applying a substantially continuous, electrically conductive coating over the insulating material;

(c) masking predetermined surface of the module prior to applying said electrically insulating material; and,

(d) removing said masking following application of said electrically conductive coating.

4,959,753

SOLID ELECTROLYTIC CAPACITOR AND METHOD OF MANUFACTURING THE SAME

Yasuo Kudoh, Yokohama; Sohji Tsuchiya, Kanagawa; Toshikuni Kojima, Kawasaki; Masao Fukuyama; Susumu Yoshimura, both of Yokohama, and Kenji Kuranuki, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Sep. 8, 1989, Ser. No. 404,465

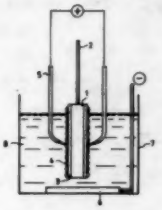
Claims priority, application Japan, Sep. 9, 1988, 63-227024; Nov. 11, 1988, 63-286136; Jun. 29, 1989, 1-169311

Int. Cl.[5] H01G *9/00*; B01J *17/00*

U.S. Cl. 361—525 **18 Claims**

1. A solid electrolytic capacitor comprising;

an electrolyte comprising a conductive polymer (i) having a repeating unit of at least one compound selected from a heterocyclic compound and (ii) containing as a dopant at least one anion selected from a naphthalenesulfonate, an alkyl naphthalenesulfonate at least one of hydrogen atoms on the naphthalene ring of which has been substituted with an alkyl group having 1 to 12 carbon atoms, an anthraquinonesulfonate, and an alkyl anthraquinonesul-



fonate at least one of hydrogen atoms on the anthraquinone ring of which has been substituted with an alkyl group having 1 to 12 carbon atoms;

said electrolyte being provided on a valve metal on the surface of which a dielectric film is formed by anodic oxidation or anodic chemical conversion.

4,959,754

ELECTROLYTIC CAPACITOR

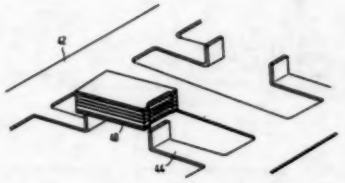
Siegfried Stiffler, Klagenfurt; Georg Hetzendorf, Vienna, both of Austria; Benedictus C. H. Fransen; Antonius G. Rijnbeek, both of Eindhoven, Netherlands, and Helfried Schmickl, Vienna, Austria, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 28, 1989, Ser. No. 387,453

Claims priority, application European Pat. Off., Aug. 16, 1988, 88201740

Int. Cl.[5] H01G *9/00*

U.S. Cl. 361—527 **14 Claims**



1. An electrolytic capacitor comprising a stack of capacitor elements, each capacitor element comprising an anode foil having a dielectric oxide layer as well as a cathode contact layer having a solid electrolytic material, characterized in that the cathode contact layer has a porous ceramic spacing layer which is impregnated with the solid electrolytic material.

4,959,755

AUTOMATIC BATTERY POWERED VIDEO LIGHT

Peter A. Hochstein, 2966 River Valley Dr., Troy, Mich. 48098

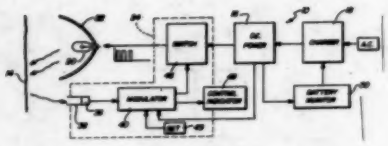
Filed Feb. 13, 1989, Ser. No. 310,307

Int. Cl.[5] G03B *15/02*; G01J *1/32*; G05F *1/00*; H05B *39/04*

U.S. Cl. 362—4 **23 Claims**

1. A portable light assembly adapted to be connected to a camera and directed toward a scene, said assembly comprising: portable housing means adapted to be connected to a camera; battery power means for supplying d.c. power; radiant means supported by said housing means and connected to said battery power means for producing radiant energy to illuminate a scene; control means supported by said housing means and

connected between said battery power means and said radiant means for receiving a control signal and for switching d.c. power to said radiant means controlling the intensity of illumination by said radiant means; said control means including sensor means for sensing ambient light and reflected radiant energy from the scene indicative of brightness of the scene and for producing said control signal, pulse width modulator for receiving said d.c. power and connected to and responsive to



the sensed brightness by said sensor means for producing said control signal comprising pulses at a predetermined frequency and for controlling the width of said pulses to control the intensity of illumination by said radiant means, and switching means in series with said power means and said radiant means for receiving said control signal and for switching power to said radiant means controlling the brightness, said switching means including a transistor operating in switch mode for switching the d.c. power to said radiant means.

4,959,756

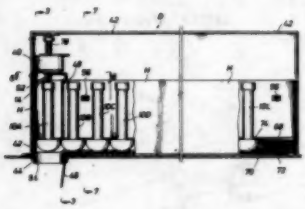
CHEMILUMINESCENT LIGHT ELEMENT DISPENSING AND ACTIVATING APPARATUS

James W. Dodson, 1115 Sheffield,, Bellaire, Tex. 77401

Filed Mar. 15, 1989, Ser. No. 324,603

Int. Cl.[5] F21K *2/00*

U.S. Cl. 362—34 **17 Claims**



1. Apparatus adapted for use with a vehicle for dispensing and activating a signal device comprising

a housing having an aperture,

a disposable holder means operatively releasably connected to said housing for positioning a plurality of signal devices relative to said housing aperture, and

means for dispensing each positioned signal device and activating a chemical reaction in the signal device to operably provide a chemiluminsecent light.

4,959,757

AUTOMOTIVE LAMP ASSEMBLY

Yutaka Nakata, Isehara, Japan, assignor to Ichikoh Industries, Ltd., Tokyo, Japan

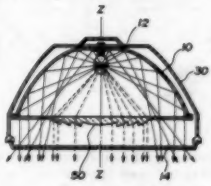
Filed May 8, 1989, Ser. No. 348,917

Claims priority, application Japan, May 9, 1988, 63-110420; May 9, 1988, 63-110421; May 17, 1988, 63-118182; May 30, 1988, 63-130407; Jun. 24, 1988, 63-155005; Jun. 30, 1988, 63-160792

Int. Cl.[5] B60Q *1/04*

U.S. Cl. 362—61 **12 Claims**

1. An automotive lamp assembly comprising a concave mirror having an optical axis and a lamp bulb disposed on said optical axis of said concave mirror, wherein said concave mirror is formed by a central reflecting area intersecting said optical axis and peripheral reflecting areas continuously extending rightward and leftward from said central reflecting area, said peripheral reflecting areas are formed as first reflecting curved surface consisting of a part of a paraboloid of revolution and which reflects the incident rays of light from said lamp bulb in directions parallel to said optical axis, and said



central reflecting area is formed as a second reflecting curved surfaces which reflects horizontally the rays of light emitted from said lamp bulb in directions convergent toward or divergent from said optical axis depending upon the distance from the vertical plane in which said optical axis lies and also reflects vertically the rays of light in directions parallel to each other and to the horizontal plane in which said optical axis lies.

4,959,758

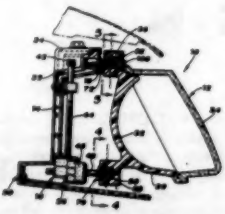
HEADLAMP ASSEMBLY

Philip C. Floss; Robert G. Roeske, and Bartley A. Hayda, all of Anderson, Ind., assignors to General Motors Corporation, Detroit, Mich.

Filed Jul. 28, 1989, Ser. No. 386,167

Int. Cl.[5] B60Q *1/06*

U.S. Cl. 362—66 **2 Claims**



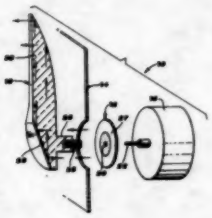
1. The combination with a headlamp assembly adapted to be mounted to a support panel at the front end of a motor vehicle through a pair of longitudinally adjustable ball pivots and a fixed ball pivot so as to allow selective adjustable movement of the lamp body about a vertical aim axis and horizontal aim axis, said lamp body including a reflector member the front of which is closed by a lens and the rear of which is integrally formed with a plurality of enlarged boss portions, each of said boss portions having a tapered wall cavity that opens to the rear of said reflector member, a bearing member located in each of said cavities and serving to connect one of said ball pivots to said lamp body, said bearing member comprising two mirror image portions which when combined provide a spherical bearing surface which encapsulates essentially the entire ball portion of the associated ball pivot so as to prevent foreign material from gaining access to said spherical bearing surface, said bearing member having an outer configuration that conforms with the tapered inner walls of said cavity in which said bearing member is inserted, and fastener means accessible from the front of said reflector member for securing each of said mirror image portions to said reflector member.

4,959,759

AUTOMOTIVE INSTRUMENT DISPLAY HAVING A THICKFILM ELECTROLUMINESCENT LIGHTPIPE POINTER

James L. Kohler, Kokomo, Ind., assignor to Delco Electronics Corporation, Kokomo, Ind.

Filed Aug. 4, 1989, Ser. No. 389,446
Int. Cl.[5] B60Q *3/04*
U.S. Cl. 362—80 5 Claims



1. Apparatus for the illumination of a vehicle instrument pointer during low ambient light conditions, comprising:

a thickfilm electroluminescent lamp emitting an area of relatively dim light, the lamp having a first side and a second side;

a pointer disposed on the first side of the electroluminescent lamp, the pointer including an internal mirrored surface for collecting the light emitted by the electroluminescent lamp and directing such light through the pointer to be reflected toward an observer of the instrument; and

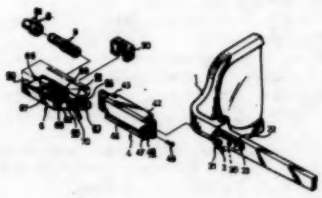
a pointer driver mechanism disposed on the second side of the electroluminescent lamp and attached to the lamp and the pointer.

4,959,760

LIGHTING EQUIPMENT FOR AN EYEGLASSES

Te Sheng Wu, No. 11, Alley 17, Lane 58, Ma Tsu Miao St., She Tou Hsiang, Chang Hua Hsien, Taiwan

Filed Jan. 19, 1990, Ser. No. 467,158
Int. Cl.[5] F21L *15/14*
U.S. Cl. 362—105 9 Claims



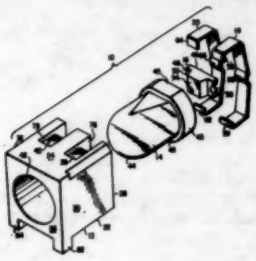
1. A lighting equipment for an eyeglasses comprising a fin attached to one side of a main frame of said eyeglasses; a clamping frame having a retaining means formed at one side thereof and having a clamping means formed at an other side thereof, said fin being force-fitted within said retaining means of said clamping frame so that said clamping frame is vertically rotatable relative to said fin; a housing having an open lateral end enclosable by said clamping frame and having an open front end; a side contact conductor and a resilient conductor being provided within said housing; and a bulb being force-fitted within said housing, a peripheral surface of a base of said bulb being electrically contacted to said side contact conductor, a center electrode of said base of said bulb being electrically contacted to said resilient conductor, a front end of said bulb being touchable from said open front end of said housing, and said bulb being laterally rotatable within said housing.

4,959,761

SURFACE MOUNTED LED PACKAGE

John Criteili, Point Pleasant; Klaus Oesterheld, Middletown; Carleton DeBaun, Toms River, and Bart Dowstra, Barnegat, all of N.J., assignors to Dialight Corporation, Manasquan, N.J.

Filed Dec. 21, 1989, Ser. No. 454,468
Int. Cl.[5] F21V *17/00*
U.S. Cl. 362—226 10 Claims



1. A surface mounted LED package comprising:

(a) a housing having:

(i) a generally rectangular parallelepipedal shape;

(ii) a first surface that, in use, is adjacent a printed circuit board;

(iii) a second surface opposite said first surface;

(iv) a third surface joining said first and second surfaces;

(v) a fourth surface opposite said third surface;

(vi) a fifth surface joining said first and second surfaces;

(vii) a sixth surface opposite said fifth surface;

(viii) a first shoulder recessed beneath said first surface;

(ix) a second shoulder recessed beneath said first surface;

(x) a third shoulder recessed beneath said second surface;

(xi) a fourth shoulder recessed beneath said second surface; and

(xii) a passageway extending from said third surface to said fourth surface;

(b) a lens received in said passageway and having:

(i) a radiating surface extending beyond said third surface of said housing;

(ii) a rear surface with a cavity sized and shaped to receive an LED; and

(iii) a light collecting surface inside above said cavity;

(c) an LED received in said cavity in said rear surface of said lens, said LED having:

(i) a first surface;

(ii) a second surface opposite said first surface;

(iii) a first electrical contact on said first surface;

(iv) a second electrical contact on said first surface; and

(v) a light emitting portion in said second surface facing said lens;

(d) a first conductive spring clip having:

(i) a first finger engaging said first shoulder;

(ii) a second finger engaging said third shoulder; and

(iii) a contact portion in electrical contact with said first electrical contact on said first surface of said LED; and

(e) a second conductive spring clip having:

(i) a first finger engaging said second shoulder;

(ii) a second finger engaging said fourth shoulder; and

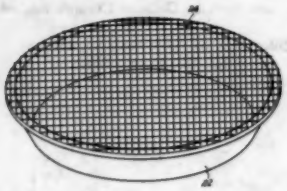
(iii) a contact portion in electrical contact with said second electrical contact on said first surface of said LED.

4,959,762

LUMINAIRE CONTAINMENT MEANS FOR LAMP RUPTURING

Trasimond A. Soileau, Flat Rock, N.C., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 8, 1988, Ser. No. 241,723
Int. Cl.[5] F21V 11/00
U.S. Cl. 362—376 15 Claims



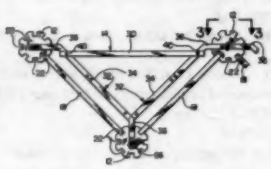
1. A luminaire comprising;
(a) an upper housing;
(b) a pressurized lamp accommodated by said upper housing, said pressurized lamp capable of encountering a non-passive explosive condition so as to project hot quartz particles having predetermined dimensions, heat capacity and temperatures;
(c) an enclosure having a window area and said enclosure capable of being ignited if subjected to encountering said hot quartz particles and;
(d) a mesh assembly interposed between said pressurized lamp and said window area of said enclosure, said mesh having openings small enough to prevent passage of said hot quartz particles having said heat capacities and said temperatures which are great enough to ignite said enclosure and yet such mesh openings being large enough to yield adequate optical transmission.

4,959,763

DISPLAY FRAME SYSTEM

George T. Baggott, Cleveland, Ohio, assignor to Import-Export, Research & Development, Inc., Cleveland, Ohio

Filed May 19, 1989, Ser. No. 354,628
Int. Cl.[5] G09F 7/00
U.S. Cl. 362—382 15 Claims



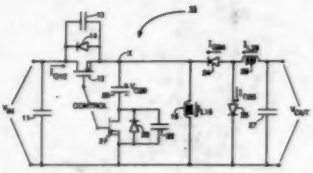
1. A display frame unit for supporting panels with parallel opposite edges for display, the frame unit comprising
three posts,
a strut assembly for connecting the posts to each other, and
fastener means for connecting the strut assembly to the ends of the posts;
pairs of posts including opposed, parallel slots for receiving the edge portions of a panel,
the strut assembly including at least one offset strut extending between a pair of posts and having a central portion offset from a plane defined by the opposed pair of slots in said pair of posts.

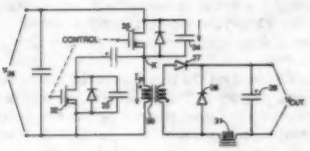
4,959,764

DC/DC CONVERTER SWITCHING AT ZERO VOLTAGE

John A. Bassett, Pleasanton, Calif., assignor to Computer Products, Inc., Boca Raton, Fla.

Filed Nov. 14, 1989, Ser. No. 436,394
Int. Cl.[5] H02M 3/335
U.S. Cl. 363—16 10 Claims





1. A single ended, zero voltage switching converter circuit comprising:
a first inductive element having a first terminal and a second terminal;
a first switching means for selectively coupling power from a power supply to said first inductive element, said first switching means including an intrinsic capacitance;
a first capacitive element having a first plate and a second plate, the first plate connected to the first terminal of said first inductive element;
a second switching means connected to the second plate of said first capacitive element and in series with said first capacitive element across said first inductive element, said second switching means including an intrinsic capacitance;
a first diode having a first terminal and a second terminal, the first terminal of said first diode connected to the first terminal of said first inductive element;
a second diode having a first terminal and a second terminal, the first terminal of said second diode connected to the second terminal of said first inductive element, and the second terminal of said second diode connected to the second terminal of said first diode;
a second inductive element having a first terminal and a second terminal, the first terminal connected to the second terminals of said first and second diodes, and the second terminal connected to an output of said converter circuit;
a third diode in parallel with said first switching means; and
a fourth diode in parallel with said second switching means;
wherein energy stored in said first inductive element discharges the intrinsic capacitance of said first switching means prior to turning on said first switching means, and
wherein energy stored in said first inductive element discharges the intrinsic capacitance of said second switch-

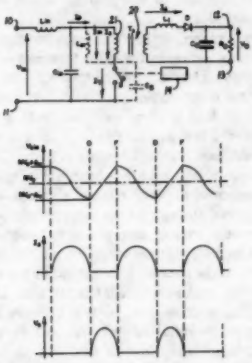
ing means prior to turning on said second switching means.

4,959,765

DC TO DC CONVERTER USING QUASI-RESONANCE

Alan Weinberg, Sassenheim, Netherlands, assignor to Agence Spatiale Europeenne, France

Filed Feb. 22, 1989, Ser. No. 314,373
Claims priority, application France, Feb. 24, 1988, 88 02239
Int. Cl.[5] H02M 3/335
U.S. Cl. 363—20 5 Claims



1. A DC to DC converter for supplying direct current from a source to a load, in particular one for operating at high frequency and for feeding traveling wave tube amplifiers (TWTA), said converter comprising:

a transformer having a primary circuit connectable to the source and containing a primary winding, said transformer having a secondary circuit connectable to the load and containing a secondary winding, said transformer possessing a magnetizing inductance (L_m) and a series inductance (L_s);

periodic switching means (S, S_1, S_2) connected in series with said primary winding in said primary circuit of said transformer, said switching means switching between a closed period when said switching means is closed and an open period when said switching means is open;

an output capacitor (C_o) connected in parallel in the secondary circuit of said transformer; and

an input capacitor (C_{in}) connected in parallel in the primary circuit of said transformer, the capacitance of said input capacitor (C_{in}) being much lower than the capacitance of said output capacitor (C_o);

said converter possessing parasitic capacitance (C_s) including that of said primary winding and said periodic switching means, said parasitic capacitance being referrable to the primary circuit of said transformer;

said input capacitor (C_{in}) and said series inductance (L_s) of said transformer forming a first circuit in said converter having a resonance period shorter than the on period of said periodic switching means (S, S_1, S_2) and controlling the current through said periodic switching means in the on periods for reducing the current through said periodic switching means to essentially zero when switching occurs in said switching means, and

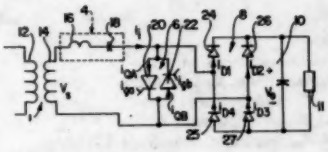
said parasitic capacitance (C_s) of said converter referred to primary circuit of said transformer and said magnetizing inductance (L_m) of said transformer forming a second circuit in said converter having a resonance period shorter than the off period of said periodic switching means and controlling the voltage across said periodic switching means in the off period for reducing the voltage across said periodic switching means to zero when switching occurs in said switching means.

4,959,766

AC/DC CONVERTER USING RESONANT NETWORK FOR HIGH INPUT POWER FACTOR

Praveen K. Jain, Nepean, Canada, assignor to National Research Council of Canada/Conseil National de Recherches du Canada, Ottawa, Canada

Filed Jul. 7, 1989, Ser. No. 376,854
Int. Cl.[5] H02M 7/06
U.S. Cl. 363—48 10 Claims



1. An AC to DC converter comprising:

(a) an input transformer for connection to a single phase, high frequency, sinusoidal wave form, AC voltage source, the transformer, in operation, providing a matching output voltage for, and isolating from, the AC voltage source,

(b) a resonant network for converting the single phase, high frequency, sinusoidal wave form, AC voltage to a sinusoidal, high frequency bi-directional current output,

(c) a current controller connected in parallel to the resonant network to receive the sinusoidal high frequency current output therefrom and provide the desired output current from the converter,

(d) a diode rectifier connected in parallel with the current controller, and for converting the bi-directional current into a unidirectional current output, and

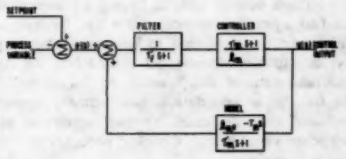
(e) an output filter connected to the rectifier to provide an essentially ripple free, substantially constant voltage DC output.

4,959,767

PARAMETER ESTIMATION TECHNIQUE FOR CLOSED LOOP SYSTEM

Marc Buchner, Beachwood, Ohio; John D. Lane, McLean, Va.; Ken Loparo, and Thomas J. Scheib, both of Chesterland, Ohio, assignors to Elsag International B.V., Amsterdam, Netherlands

Filed Nov. 23, 1988, Ser. No. 275,813
Int. Cl.[5] G05B 13/02
U.S. Cl. 364—151 5 Claims



1. A process control system, comprising:

a controller for producing a control output for said process;

means for providing a first response, resulting from a comparison of a process variable and a setpoint, to a summation unit;

a model, connected to said controller and located in a feedback loop, for receiving said control output and providing an output to said summation unit; and

means, connected to said summation unit, for providing a second response to said controller, said controller and said model including algorithm means for updating said model based on estimated process parameters of observed process gain, lag time constant, and deadtime in response to changes in the setpoint, said algorithm means numerically calculating the values of the following control area integrals as the control output approaches the setpoint

$$I_1 = \frac{1}{\Delta SP} \int_0^\infty [m_\infty - m(t)]dt$$

$$I_2 = \frac{1}{\Delta SP} \int_0^\infty [m_\infty - m(t)]e^{-\alpha t}dt$$

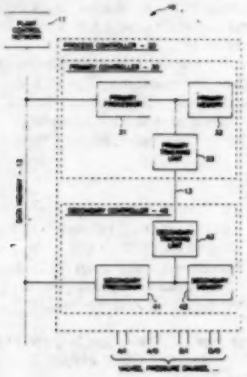
where:
I_1, I_2 = Control Area Integrals
m_∞ = Final Value, Control Output
m(t) = Control Output at time t
SP = Change in setpoint
α = Weighting Parameter = $(\tau_m + T_m)^{-1}$.

4,959,768

APPARATUS FOR TRACKING PREDETERMINED DATA FOR UPDATING A SECONDARY DATA BASE

Paul B. Gerhart, Horsham, Pa., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 23, 1989, Ser. No. 299,857
Int. Cl.[5] G06F 11/20
U.S. Cl. 364—187 **2 Claims**



1. In a process control system, having a primary processor connected to a primary memory via a bus, wherein said primary processor transfers data to be stored to said primary memory, an apparatus, connected to said bus, for collecting predetermined data of said transferred data simultaneously with the transfer of said data to said primary memory, said predetermined data collected by said apparatus to subsequently update a data base of a backup process controller, said apparatus comprising:

(a) storage means, for storing the predetermined data collected, said storage means having a data terminal adapted to receive data to be stored in said storage means, and further having an address terminal adapted to receive address information specifying an address location within said storage means in which the received data is to be stored;

(b) control processing unit (CPU) means, operatively connected to said bus, for coordinating the control of said apparatus with the operation of said primary processor;

(c) logic means, operatively connected to said CPU means, for generating predetermined control signals, to control the storage means;

(d) counter means, operatively connected to said CPU means and to said storage means, for generating the address information to indicate a location of the storage means in which the predetermined data being collected is to be stored;

(e) control means, operatively connected to said storage means and to said logic means, for transferring the predetermined data stored in said storage means to the backup process controller;

(f) a first switch means, interposed between said bus and said storage means, wherein the data terminal of said storage means is connected to the output of said first switch means, a first input terminal of said first switch means is connected to data lines of said bus, and a second input terminal of said first switch means is connected to address lines of said bus, for selecting between the first input terminal and the second input terminal of said first switch means in response to a first control signal to obtain data to be stored in said storage means in a predefined format; and

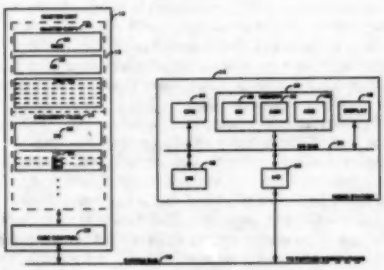
(g) second switch means, interposed between said counter means and said storage means, wherein the address terminal of said storage means is connected to the output of said second switch means, a first input terminal of said second switch means is connected to said counter means, and a second input terminal of said second switch means is connected to address lines of said bus, for selecting address information between said counter means and said bus in response to a second control signal to store or retrieve data, respectively, from said storage means.

4,959,769

STRUCTURES AND METHODS FOR REPRESENTING AND PROCESSING DOCUMENTS

James L. Cooper, and Marc D. San Soucie, both of Tyngsboro, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.

Continuation of Ser. No. 656,831, Oct. 2, 1984, abandoned, which is a continuation-in-part of Ser. No. 538,644, Oct. 3, 1983. This application Nov. 17, 1987, Ser. No. 122,594
Int. Cl.[5] G06F 15/20
U.S. Cl. 364—200 **22 Claims**



1. In a document processing system including storage means for storing blocks of data and processing means for processing the data blocks and wherein a document is represented by a chain of text blocks of the data blocks in the storage means which contains test belonging to the document, the chain being formed by means of chaining information in each text block by means of which the processing means locates the following block in the chain, the method of inserting characters into the

text contained in the chain at a given position in the text comprising for any insertion of characters the steps of:

(1) immediately following a first text block containing the given position, inserting a second empty text block marked with an insertion mark into the chain by copying the chaining information from the first text block into the second empty text block and setting the chaining information in the first text block to specify the second empty text block;

(2) copying the text which follows the given position in the first text block into the second text block;

(3) deleting the copied text from the first text block;

(4) inserting the characters at the end of the text remaining in the first text block; and

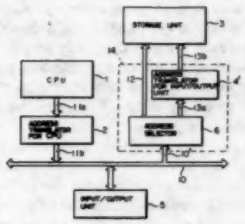
(5) on completion of the insertion, removing the insertion mark.

4,959,770

DATA PROCESSING SYSTEM EMPLOYING TWO ADDRESS TRANSLATORS, ALLOWING RAPID ACCESS TO MAIN STORAGE BY INPUT/OUTPUT UNITS

Megumu Kondo; Shuji Kamiya, both of Kawasaki; Kazuhiko Fukuoka, Machida; Masatsugu Shinozaki, Hadano, and Hitoshi Sadamitsu, Kanagawa, all of Japan, assignors to Hitachi Ltd. and Hitachi Microcomputer Engineering, both of Tokyo, Japan

Filed May 22, 1987, Ser. No. 52,870
Claims priority, application Japan, May 23, 1986, 61-117381
Int. Cl.[5] G06F *12/00*
U.S. Cl. 364—200 **10 Claims**



1. A data processing system comprising:

a central processing unit;

an address bus;

first translation means coupling said central processing unit to said address bus for translating a first logical address from said central processing unit into a first physical address and applying the first physical address to said address bus;

at least one input/output device connected to said address bus for applying a second logical address to said address bus;

a storage device;

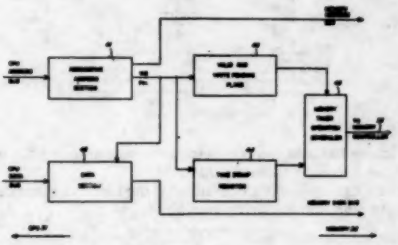
coupling means coupling said address bus to said storage device and responsive to a characteristic of signals applied thereto indicative of the first physical address being on said address bus for supplying the first physical address from said address bus to said storage device and responsive to a characteristic of signals applied thereto indicative of the second logical address being on said address bus for translating the second logical address from said address bus into a second physical address and supplying the second physical address to said storage device.

4,959,771

WRITE BUFFER FOR A DIGITAL PROCESSING SYSTEM

Joseph L. Ardini, Jr., Needham, and Steven Small, Waltham, both of Mass., assignors to Prime Computer, Inc., Natick, Mass.

Continuation of Ser. No. 36,925, Apr. 10, 1987, abandoned. This application Sep. 14, 1989, Ser. No. 407,693
Int. Cl.[5] G06F *12/00*
U.S. Cl. 364—200 **13 Claims**



1. Digital processing apparatus comprising:

A. a central processor;

B. a memory having a plurality of memory locations;

C. a write buffer operatively associated with said memory, said write buffer including (i) n write buffer locations for storing data received from said central processor, where n is an integer greater than one, (ii) means for merging data designated by said central processor for subsequent storage in contiguous locations in said memory, and (iii) write means for selectively writing said data from said plurality of write buffer locations to said memory;

D. time stamp register means, in communication with said merge means, for storing and updating a time signal representative of the write buffer location having most recently received data stored therein; and,

E. controller means, responsive in part to said time signal, for controlling said write means to select data for writing to memory from data stored in a candidate set of said locations in said write buffer, said candidate set not including the location represented by said time signal, whereby data in said location represented by said time signal are disregarded as a candidate for writing to memory and are stored pending the arrival of additional data.

4,959,772

SYSTEM FOR MONITORING AND CAPTURING BUS DATA IN A COMPUTER

Royston L. Smith, Plantation, and Maria V. Rabaza, Miami Lakes, both of Fla., assignors to Gould Inc., Rolling Meadows, Ill.

Filed Mar. 24, 1988, Ser. No. 173,222
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—200 **24 Claims**

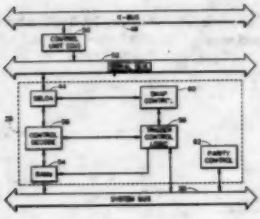
1. A system for monitoring and capturing bus data in a digital computer having a CPU, a memory, at least one I/O module, each having a parity generator for generating a parity bit, a system bus for permitting communication between the CPU, memory and I/O module, the system bus including an address filed, a data field and a control field, each field including a plurality of lines for transmitting digital signals representing predetermined information, and a plurality of clock generators for timing the transmission of the digital signals on the lines,

a buffer for storing information represented by the digital signals;

means for accessing the system bus and storing in the buffer the information represented by the digital signals transmit-

ted on the lines of the fields during pre-selected time intervals; and

means for analyzing the information stored in the buffer to



locate faults in the computer without disrupting the normal operation thereof; and

means for controlling operation of the clock commands of the plurality of clock generators.

4,959,773

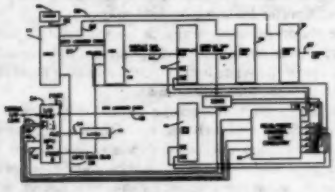
ADAPTER FOR ATTACHING I/O DEVICES TO I/O COMMUNICATIONS WITH ALTERNATING READ AND WRITE MODES LINK

John D. Landers, Jr., Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 672,512, Nov. 19, 1984, abandoned. This application Jan. 7, 1988, Ser. No. 143,283

Int. Cl.[5] G06F *13/00, 15/62*

U.S. Cl. 364—200 **6 Claims**



1. An adapter for interfacing a device with a serial data link comprising:

a first storage means for storing data supplied from the serial data link;

a second storage means for storing device data;

a device address bus coupled to the second storage means;

a device data bus coupled to the second storage means;

a microprocessor coupled to the serial data link and for generating enabling signals;

a microprocessor address bus interconnecting the first storage means and the microprocessor;

a microprocessor data bus interconnecting the first storage means and the microprocessor;

a first control means for controlling the flow of data between the device data bus and the microprocessor data bus;

a second control means for interconnecting the microprocessor address bus and the device address bus; and

a third control means responsive to the enabling signals and to generate other control signals for activating the first and second control means and for simultaneously placing the first storage means and the second storage means into respective read and write modes so that if the microprocessor executes a first command on the first storage means when it is in read mode data stored at a selected address in said first storage means is copied at an identical address in the second storage means and if the microprocessor executes the first command on the second storage means when it is in a read mode data stored at a selected address in the second storage means is copied in the first storage means.

4,959,774

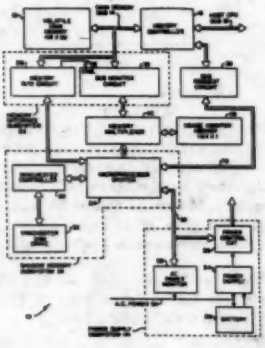
SHADOW MEMORY SYSTEM FOR STORING VARIABLE BACKUP BLOCKS IN CONSECUTIVE TIME PERIODS

John E. Davis, Reseda, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Continuation of Ser. No. 628,417, Jul. 6, 1984, abandoned. This application Jun. 30, 1989, Ser. No. 374,614

Int. Cl.[5] G06F *15/00, 11/30, 12/16*

U.S. Cl. 364—200 **23 Claims**



17. A backup data storage system for a primary data store having a plurality of storage locations addressable by a data processing system, each primary data store addressable storage location being assigned to one of a plurality of primary store data blocks, each containing the data stored by all of the addressable storage locations assigned thereto, the backup data storage system comprising:

first means for storing a write indication at each of a plurality of addressable storage locations, each of which has a predetermined correspondence with one of the data block;

means for writing a write indication into the first means for storing a write indication each time data is written by the data processing system into the primary data store, the write indication being stored at a location corresponding to a primary store data block into which the data has been written;

second means for storing a plurality of backup data blocks, each corresponding to a different primary store data block; and

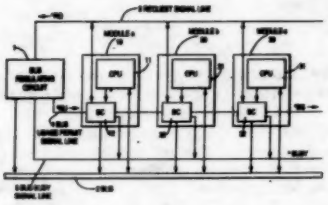
data processing means, connected to the first storing means, the means for writing a write indication, the second storing means, and the primary data store, comprising means coupled to the firs storing means for determining when said writing means is not accessing the first storing means, means for continually accessing said first storing means when said first storing means is available for data communication and for repetitively reading sequential addressable storage locations of the first storing means, wherein the number of addressable storage locations read varies with the time during which said first storing means is available for data communications, and means, upon reading a write indication from a currently addressed storage location, for copying the primary store data block corresponding thereto to the corresponding backup data block stored by the second storing means.

4,959,775

BUS REGULATING SYSTEM

Mikio Yonekura, Hachioji, Japan, assignor to Fanuc Ltd., Minamitsuru, Japan

PCT No. PCT/JP87/00306, § 371 Date Dec. 22, 1987, § 102(e) Date Dec. 22, 1987, PCT Pub. No. WO87/07409, PCT Pub. Date Dec. 3, 1987
PCT Filed May 16, 1987, Ser. No. 145,751
Claims priority, application Japan, May 29, 1986, 61-124236
Int. Cl.[5] G06F *13/14, 13/36*
U.S. Cl. 364—200 2 Claims



1. A bus regulating system for regulating the right to use a plurality of modules commonly connected to a bus for transferring data, the modules coupled to each other in the form of a chain by a bus usage permit signal line means, said bus regulating system comprising:

request signal line means for transferring a first request signal and commonly coupling the modules to each other;

bus busy signal line means for transferring a bus busy signal and commonly coupling the modules to each other;

a bus regulating circuit, coupled to said request signal line means, said bus busy signal line means and the bus usage signal line means, for inputting a bus usage permit signal to the bus usage permit signal line means in accordance with said first request signal and said bus busy signal;

a microprocessor, mounted in each of the modules, for controlling each of the modules for outputting a second request signal for requesting use of the bus and outputting first and second control signals; and

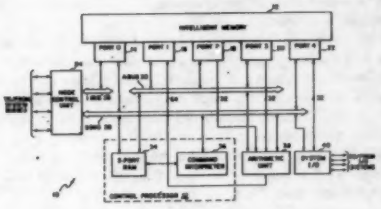
bus control circuit means, coupled to said microprocessor, each of said bus control circuit means mounted on each of said modules and coupled to each of said request signal line means, the bus usage permit line means, and said bus busy signal line means, for receiving, respectively, said second request signal output from said microprocessor, said first and second control signals output from said microprocessor, and the bus usage permit signal on the bus usage permit signal line, and outputting said bus busy signal on said bus busy signal line means, for determining whether or not said first request signal is to be output to said request signal line means in accordance with said second request signal and said first and second control signals, for obtaining a right to use the bus when the bus usage permit signal is input to said bus control circuit when said first request signal is output on said request signal line means by outputting said bus busy signal on said bus busy signal line means, for transferring the bus usage permit signal to a next one of said bus control circuit means when said first request signal is not output, and for outputting said bus busy signal on said bus busy signal line means while said second control signal is input and until said first request signal is output from another module.

4,959,776

METHOD AND APPARATUS FOR ADDRESSING A MEMORY BY ARRAY TRANSFORMATIONS

Alan J. Deerfield, Newport, R.I., and Sun-Chi Siu, Marlboro, Mass., assignors to Raytheon Company, Lexington, Mass.

Division of Ser. No. 135,579, Dec. 21, 1987, Pat. No. 4,819,152.
This application Dec. 5, 1988, Ser. No. 279,607
Int. Cl.[5] G06F *12/06*
U.S. Cl. 364—200 18 Claims



1. A method of generating addressing sequences for accessing a multidimensional array of data in a digital system comprising the steps of:

interpreting instruction commands;

performing arithmetic operations based on said commands;

storing data used in said arithmetic operations in a memory means;

generating addressing sequences specified by an array transformation of a high-level programming language in accordance with a nested series of a plurality of parameters of said array transformation, for serially accessing all elements of said data array;

interpreting a boundary parameter of said array transformation for controlling the generating of said addressing sequences when an address of said sequence is generated outside a boundary of said array; and

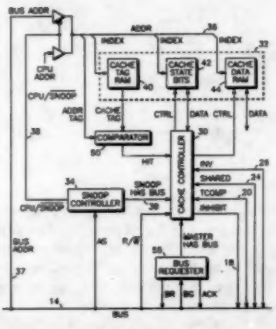
transferring said data between said memory means and arithmetic means performing said arithmetic operations as specified by said array transformation.

4,959,777

WRITE-SHARED CACHE CIRCUIT FOR MULTIPROCESSOR SYSTEM

Thomas H. Holman, Jr., Austin, Tex., assignor to Motorola Computer X, Schaumburg, Ill.

Filed Jul. 27, 1987, Ser. No. 78,436
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—200 5 Claims



1. A multiprocessor system comprising:

a random access memory (RAM);

a plurality of central processing units (CPU's);

a plurality of cache memories, one of said cache memories being coupled to each of said plurality of CPU's;

a plurality of logic means for coordinating data transfer, one of said logic means being coupled to each of said plurality of cache memories;

a system bus to which said RAM, said plurality of CPU's, and said plurality of cache memories are coupled, said system bus enabling address and data information to be exchanged among said RAM, said plurality of CPU's, and said plurality of cache memories;

a first signal line to which each of said plurality of logic means is coupled;

a first one of said plurality of logic means, being coupled to a first cache memory of said plurality of cache memories, comprising means for monitoring said system bus to determine whether a data block being read by a CPU coupled to a second cache memory of said plurality of cache memories is contained in said first cache memory and, if so, generating a first signal level on said first signal line, and otherwise generating a second signal level on said first signal line; and

a second one of said plurality of logic means, being coupled to said second cache memory, comprising means for enabling said CPU coupled to said second cache memory, if it subsequently performs a write operation to a data block in said second cache memory, to write the data in said data block through to said RAM if said first signal level is present on said first signal line, and for inhibiting said CPU from writing said data through to said RAM if said second signal level is present on said first signal line,

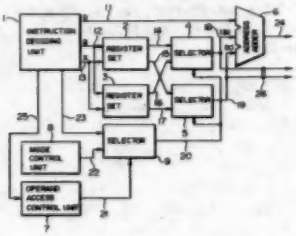
whereby said CPU coupled to said second cache memory is inhibited from using said system bus when it performs a write operation on said data block in said second cache memory, if said data block is not contained in said first cache memory, thereby reducing traffic on said system bus.

4,959,778

ADDRESS SPACE SWITCHING APPARATUS

Hiroo Miyadera, Atsugi; Toru Ohtsuki, and Toshiaki Kawamura, both of Hadano, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 30, 1988, Ser. No. 251,841
Claims priority, application Japan, Oct. 2, 1987, 62-247798
Int. Cl.[5] G06F 9/34
U.S. Cl. 364—200 **10 Claims**



1. An address space switching apparatus comprising:

address computing means for computing an address;

a first group of registers for storing address information;

a second group of registers for storing address information that is longer than the address information stored in said first group of registers;

selector means controlled by a first control signal for respectively selecting, in response to a first state or a second state of the first control signal, an output from said first group of registers or said second group of registers in order to supply the selected output to said address computing means;

means for generating a second control signal indicating a time period during which an operand address is to be generated;

means for generating a third control signal indicating whether or not an operand address space is to be extended; and

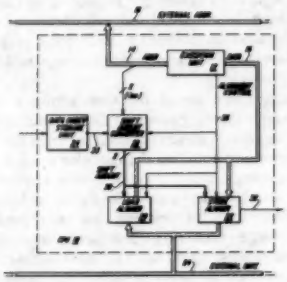
means responsive to the third control signal when the second control signal indicates the time period during which an operand address is to be generated for forcing the first control signal into the second state when the third signal indicates that an operand address space is to be extended and for forcing the first signal into the first state when the third signal indicates that an operand address space is not to be extended.

4,959,779

DUAL BYTE ORDER COMPUTER ARCHITECTURE A FUNCTIONAL UNIT FOR HANDLING DATA SETS WITH DIFFERNT BYTE ORDERS

Larry B. Weber, Palo Alto; Craig C. Hansen, Mountain View; Thomas J. Riordan, Atherton, and Steven A. Przybylski, Menlo Park, all of Calif., assignors to Mips Computer Systems, Inc., Mountain View, Calif.

Continuation of Ser. No. 827,282, Feb. 6, 1986, abandoned. This application Nov. 28, 1988, Ser. No. 277,406
Int. Cl.[5] G06F 7/00
U.S. Cl. 364—200 **4 Claims**



1. A data processing unit, which comprises:

an execution unit for processing data;

an internal data bus coupled to said execution unit for input of internal bus data to said execution unit, the internal bus data being organized into information units, each comprising a series of individual data groups, the individual data groups of each respective information unit being arranged within the respective information unit and relative to one another, in a preselected internal data ordering sequence for processing by said execution unit;

means for aligning data groups within a respective information unit coupled to said internal data bus;

an external data bus coupled to said means for aligning data groups, for input of external bus data to said means for aligning data groups, said external bus data being organized into the information units, each comprising a series of the individual data groups, the individual data groups of each information unit of the external bus data being arranged within the respective information unit and relative to one another, in an external data ordering sequence;

a shift amount converter unit coupled to said means for aligning data groups within a respective information unit;

means for storing information indicative of the preselected internal data ordering sequence and the external data ordering sequence and for generating a control signal

indicative of a relationship between the preselected internal data ordering sequence and the external data ordering sequence;

said means for generating a control signal being coupled to said shift amount converter unit for input of said control signal to said shift amount converter;

said shift amount converter being responsive to said control signal to control said means for aligning to realign the data groups of each information unit of the external bus data, input to said means for aligning data groups, from the external data ordering sequence into the preselected internal data ordering sequence to provide the internal bus data for input to said execution unit; and

means to selectively input information indicative of the external data ordering sequence to said means for storing information.

4,959,780

MICROPROGRAM PROCESSOR WITH LOGIC CIRCUITRY FOR COMBINING SIGNALS FROM A MICROCODE DECODER AND AN INSTRUCTION CODE DECODER TO PRODUCE A MEMORY ACCESS SIGNAL

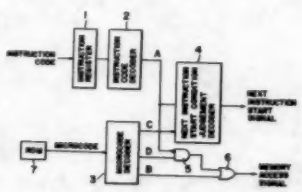
Akio Miyoshi, Ome, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Mar. 3, 1988, Ser. No. 175,293

Claims priority, application Japan, Mar. 31, 1987, 62-79164

Int. Cl.[5] G06F *13/00, 9/22*

U.S. Cl. 364—200 **1 Claim**



1. A microprogram processor comprising:

instruction holding means for receiving and holding a unit length of a macro instruction code;

instruction code decoding means for receiving said instruction code from said instruction holding means and decoding said code to generate an output signal dependent upon the fact that the operand and said received instruction code indicates a register or a memory;

storing means for storing microprograms provided for respective macro instruction codes and supplying microcodes;

microcode decoding means for decoding said microcodes supplied from said storing means and generating an unconditional memory access signal and a conditional signal for starting a next instruction depending upon said macro instruction code, and generating a conditional memory access signal when a conditional memory access microcode causes said microcode decoding means to generate a specific output if said operand for said instruction indicates a memory;

means for judging a next instruction start condition connected to receive said output signal from said instruction code decoding means and said conditional signal for starting a next instruction from said microcode decoding means to judge whether or not said next instruction start is correct; and

means for generating a memory access signal for starting access of a memory on the basis of said unconditional memory access signal, said conditional memory access signal and said output signal from said instruction code decoding means,

wherein said microcode decoding means comprises decoding means for decoding a specific microcode to generate said conditional signal for starting said next instruction and

wherein said means for generating said memory access signal comprises a logical product circuit for generating said memory access signal which is a logical product signal of said conditional memory access signal and said output from said instruction code decoding means, and a logical sum circuit for generating a logical sum signal of the logical product signal and said unconditional memory access signal.

4,959,781

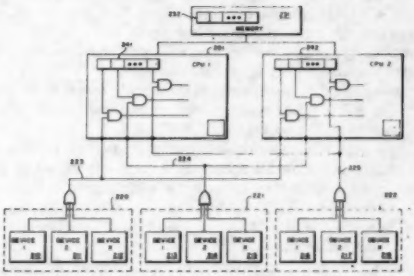
SYSTEM FOR ASSIGNING INTERRUPTS TO LEAST BUSY PROCESSOR THAT ALREADY LOADED SAME CLASS OF INTERRUPT ROUTINES

Jon Rubinstein, Palo Alto, and Kenneth C. Klingman, Portola, both of Calif., assignors to Stardent Computer, Inc., Sunnyvale, Calif.

Filed May 16, 1988, Ser. No. 194,457

Int. Cl.[5] G06F *9/46, 13/14, 13/24, 15/16*

U.S. Cl. 364—200 **7 Claims**



1. A computer system having means for processing interrupts comprising:

one to four MIPS processors for servicing interrupts, each of said processors having means for disabling processing of said interrupts, each of said means for disabling processing of said interrupts comprising a register means having Y memory areas, where Y is a positive number, each of said Y memory areas corresponding to one of Y interrupt classes, said means for disabling processing of interrupts further comprising Y logic gates, each of said Y logic gates having as inputs a signal line from one of said Y memory areas, and a signal line from one of said Y interrupt classes;

a plurality of devices for asserting interrupts, each of said plurality of devices for asserting interrupts coupled to all of said processors for substantially at the same time asserting interrupts to each of said processors, said plurality of devices grouped into said Y interrupt classes;

memory means coupled to all of said processors, said memory means having Y memory locations, each of said Y memory locations corresponding to one of said Y interrupt classes, each of said Y memory locations for indicating whether each of said corresponding Y interrupt classes has been assigned for processing by one of said processors;

means for assigning processing of all interrupts corresponding to one of said Y interrupt classes to one of said N processors.

4,959,782

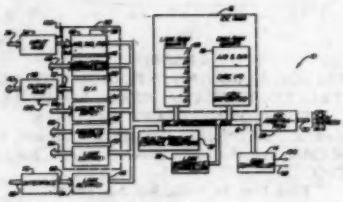
ACCESS ARBITRATION FOR AN INPUT-OUTPUT CONTROLLER

Bhaichandra R. Tulpule, Vernon, and Daniel G. Binnall, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 924,647, Oct. 29, 1986, abandoned. This application Jan. 18, 1990, Ser. No. 465,590

Int. Cl.[5] G06F *13/28, 13/00*

U.S. Cl. 364—200 **7 Claims**



1. A method for arbitrating access to an input-output controller's (IOC's) random access memory (RAM) between the IOC's input-output (I/O) bus and a signal processor's I/O bus, the IOC's I/O bus being connected to a plurality of sensors and actuators, the signal processor having an instruction set, each instruction requiring one or more minimum machine cycles for execution, comprising the steps of:

having the IOC always grants the signal processor access to the IOC's RAM upon receipt of a demand by the signal processor for access to the IOC's RAM;

having the IOC monitor the signal processor's activity at the beginning of each machine cycle to detect the signal processor engaged in an activity which does not require access to the IOC's RAM and in which it will be engaged in a non-IOC RAM access activity for the minimum machine cycle; and

having the IOC, upon detecting the processor so engaged, permit the IOC's I/O bus to gain access to the IOC's RAM, but only during the minimum machine cycle.

4,959,783

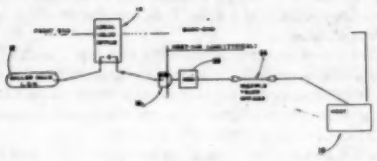
SYSTEM AND METHOD FOR CHOOSING RANDOM NUMBERS AND DELIVERING SUCH NUMBERS TO SUBSCRIBERS FOR PLAYING GAMES OF CHANCE

James Scott, Sunrise, and Dennis Mosley, Pembroke Pines, both of Fla., assignors to Lotto Pick Quick Winning Odds, Ltd., Ft. Lauderdale, Fla.

Filed Apr. 6, 1989, Ser. No. 334,168

Int. Cl.[5] G06F *15/28*

U.S. Cl. 364—412 **11 Claims**



9. A method of providing multiple digit random number picks to a caller/subscriber using conventional telephone facilities, said method comprising the steps of:

a. dialing an indicated telephone number by a caller/subscriber using the conventional telephone facilities,

b. establishing communication to one of a plurality of processing means and interconnecting the one processing means to a host computer using the conventional telephone facilities,

c. generating at least one multi-digit random number pick within a preselected numerical range and transmitting the one random number pick to the one processing means,

d. communicating the one random number pick to the caller/subscriber in an audible mode,

e. generating a predetermined plurality of random number picks by said host computer and transmitting said predetermined plurality of random number picks to said one processing means, and

f. storing said predetermined plurality of random number picks in said one processing means prior to establishing a call-in link with a caller/subscriber.

4,959,784

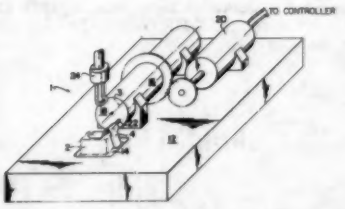
METHOD AND SYSTEM FOR ADJUSTING RELAY ARMATURES

Steven J. Kwapisz, Madison Heights, Mich., assignor to United Technologies Automotive, Dearborn, Mich.

Filed Sep. 28, 1989, Ser. No. 413,668

Int. Cl.[5] G01R *31/32*

U.S. Cl. 324—418 **7 Claims**



1. A system for adjusting the curvature of an electrical relay armature in an electrical relay, wherein the system determines the adjustment necessary for the required electrical operation of the electrical relay in a preselected voltage range based on a comparison of the electrical relay's actual energizing voltage with the preselected energizing voltage range, comprising:

a rotatable carrier,

a cam supported by the carrier, rotation of the carrier causing the cam to strike the relay armature at a predetermined location, resulting in a precalculated permanent deformation to the relay armature,

means for rotating the carrier,

means for supporting the relay armature during adjustment thereof,

means for determining the electrical relay energizing voltage, and

means, responsive to the determined electrical relay energizing voltage, for controlling the carrier rotating means.

4,959,785

CHARACTER PROCESSING SYSTEM WITH SPELLING CHECK FUNCTION THAT UTILIZES CONDENSED WORD STORAGE AND INDEXED RETRIEVAL

Yasushi Yamamoto, Kyoto, and Keizo Saito, Souraku, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed May 25, 1988, Ser. No. 198,503

Claims priority, application Japan, May 26, 1987, 62-128687

Int. Cl.[5] G06F *15/38*

U.S. Cl. 364—419 **11 Claims**

1. A character processing system with a spelling check function comprising:

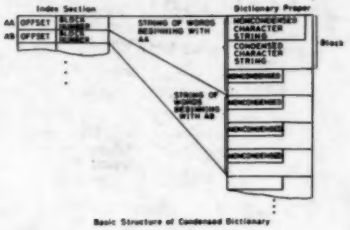
input means for inputting character information and instructions;

storage means for storing said character information;

display means for displaying said character information and said instructions;

control means, coupled to said input means, said storage means, and said display means, for supplying said character information input by said input means to said storage means for storage therein and for outputting said character information to said display means for display thereon; condensed dictionary storage means including,

a dictionary proper composed of a plurality of n-byte blocks, said dictionary proper storing a respective first word in each of said blocks in the form of a character string composed of noncondensed bytes with subsequent words thereafter stored in the form of a condensed relative code with a common part relative to an immediately preceding word as the object, said dictionary proper storing words



Basic Structure of Condensed Dictionary

not transformable into condensed relative code via Huffman encoding allocated in consideration of frequency of occurrence, and

an index section for storing offsets derived from the dictionary proper which indicate the number of bytes from an initial position of the dictionary proper a specified block is located and for storing block numbers which indicate the number of blocks in a specified group; and spelling check means, coupled to said control means and said condensed dictionary storage means, for performing a dichotomizing search of a specified block, the address of said specified block being determined thereby as a function of the first two letters of a search word which specify the offset and block number stored in the index section corresponding to the specified block to thereby retrieve said search word.

4,959,786

DUAL REGULATOR FOR REDUCING SYSTEM CURRENT DURING AT LEAST ONE MODE OF OPERATION

Thomas Glowczewski, Washington Township; Keith B. Carle, Hartland, and Michael R. Lindsay, Livonia, all of Mich., assignors to Chrysler Corporation, Highland Park, Mich.

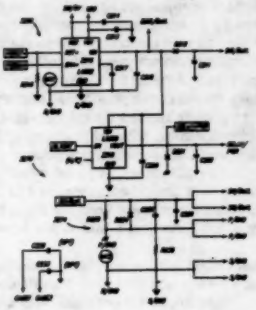
Filed Apr. 29, 1988, Ser. No. 188,600
Int. Cl.[5] B60K *41/18*; G06F *1/32*
U.S. Cl. 364—424.1 **4 Claims**

4. In an automatic transmission control system having a plurality of gears for transmitting power from a prime mover to a load device over desired ranges of torque and speed, and an assembly of friction elements with hydraulic fluid associated therewith, the friction elements for selectively disengaging and engaging the gears from the prime mover, where the control system includes means for sensing the input and output speeds of the transmission and generating signals representative thereof, means for sensing the power demand on the prime mover and generating signals representative thereof, means for providing an indication of a manually selected mode of operation for the transmission and generating signals representative thereof, and means for controlling the flow of hydraulic fluid associated with the operation of the friction elements; an electronic controller means for controlling the actuation of the means for controlling the flow of hydraulic fluid in response to said representative signals; a regulator circuit to generate a switched voltage for the electronic controller; the regulator circuit comprising:

a dual regulator having at least two voltage outputs, where at least one voltage output is switchable;

high priority circuitry including a microcomputer electrically connected to one voltage output of the dual regulator;

low priority circuitry including circuits peripheral to the microcomputer and electrically connected to the switchable voltage output of the dual regulator;



means for providing a signal to the dual regulator in response to a "key-on" condition to enable the one voltage output to provide power continuously to both the high and low priority circuitry; and

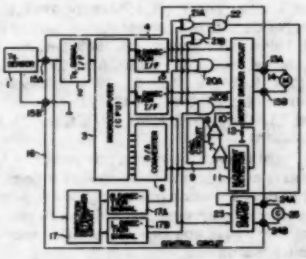
the microcomputer including means for controlling the dual regulator to disengage the switchable voltage output in response to a "key-off" condition to reduce power to the low priority circuitry after a time period determined by the microcomputer when predetermined conditions exist.

4,959,787

ELECTRIC POWER STEERING DEVICE HAVING A CLUTCH

Mitsuharu Morishita; Kosaku Uota, and Takeshi Yasukawa, all of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 5, 1989, Ser. No. 333,503
Claims priority, application Japan, Apr. 6, 1988, 63-86121; Apr. 6, 1988, 63-86122; Apr. 26, 1988, 63-104706
Int. Cl.[5] B62D *5/04*
U.S. Cl. 364—424.05 **9 Claims**



1. An electric motor assisted power steering device for an automotive vehicle which includes a steering wheel operated by an operator of the vehicle, at least one steered wheel, and a steering shaft operatively coupling the steering wheel to the steered wheel, said power steering device comprising:

an electric motor rotatable in first and second directions by

a supply of a current in said first and second directions, wherein said electric motor provides an auxiliary torque to the steering shaft in right and left directions by rotating in said first and second directions, respectively;

clutch means for connecting and disconnecting said electric motor to and from the steering shaft;

torque sensor means for detecting a steering torque of the steering shaft applied by the operator of the vehicle via the steering wheel;

computation means, including a microcomputer coupled to an output of said torque sensor, for determining a direction of said auxiliary torque corresponding to said steering torque of the steering shaft applied by the operator, and for determining an amount of the auxiliary torque which is to be provided by said electric motor to the steering shaft;

direction determiner circuit means, coupled to an output of said torque sensor means, for determining a direction of said auxiliary torque corresponding to said steering torque of the steering shaft applied by the operator;

first logical circuit means, coupled to outputs of said computation means and said direction determiner circuit means, for generating a right direction signal when the directions determined by said computation means and said direction determiner circuit means are both the right direction, and generating a left direction signal when both are the left direction;

second logical circuit means, coupled to said outputs of said computation means and said direction determiner circuit means, for generating an output signal when the directions determined by said computation means and said direction determiner circuit means are in disagreement;

motor current control means, coupled to an output of said first logical circuit means, for controlling a current supplied to said electric motor to an amount corresponding to said amount of auxiliary torque determined by said computation means, wherein said motor current control means controls a direction of current supplied to said electric motor to said first direction in response to said right direction signal and to said second direction in response to said left direction signal; and

clutch driver means, coupled to an output of said second logical circuit means, for disengaging said clutch means to disconnect said electric motor from said steering shaft, in response to said output signal of said second logical circuit means.

4,959,788

IC CARD WITH KEYBOARD FOR PRESTORING TRANSACTION DATA

Masanori Nagata; Shinya Yoshida, both of Kyoto; Susumu Yamashita, Kanagawa, and Makoto Okahashi, Osaka, all of Japan, assignors to Omron Tateisi Electronics Co., Japan

Continuation-in-part of Ser. No. 55,258, May 29, 1987, abandoned, and Ser. No. 711,818, Mar. 19, 1985, abandoned, said Ser. No. 55,258, is a continuation-in-part of Ser. No. 711,818. This application Apr. 14, 1988, Ser. No. 181,716

Claims priority, application Japan, Mar. 19, 1984, 59-53949; Mar. 21, 1984, 59-54966; Mar. 21, 1984, 59-54967; Mar. 21, 1984, 59-54968; May 30, 1986, 61-126897

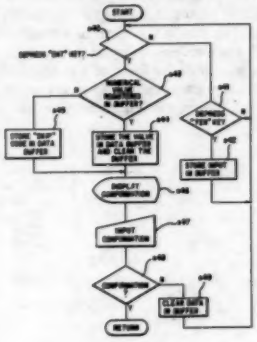
Int. Cl.[5] G07F 7/10; G06K 1/18; G06F 15/30

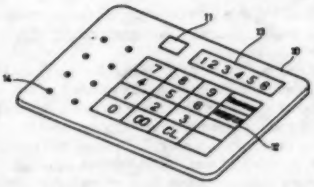
U.S. Cl. 364—408 **1 Claim**

1. An IC card transaction system comprising:

an IC card comprising first entry means for entering at least a part of the transaction processing data required to complete a transaction processing, and data storage means for storing the transaction processing data entered by said first entry means; and

an automatic transaction processing unit comprising (i) read out means for reading out transaction processing data stored in said data storage means of said IC card, (ii) a memory for storing transaction processing data read out from said data storage means of said IC card by said readout means, (iii) check means for checking said memory to determine what transaction data, which is required for the processing of said transaction, is not stored in said memory, (iv) second entry means for entering transaction data into said processing unit required for processing of said transaction which is not stored in said memory, and (v) means for executing said transaction processing using transaction data read out from said data storage means of said IC card and said transaction data entered by said





second entry means, wherein said first entry means includes means for entering and storing a "skip" code in said data storage means corresponding to those portions of said required transaction processing data which are not entered into said IC card, and wherein said check means checks said skip code to determine what transaction data, required for processing of said transaction, is not stored in said memory.

4,959,789

FUEL INJECTION CONTROL SYSTEM FOR AN AUTOMOTIVE ENGINE

Mitsuo Nakamura, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 2, 1989, Ser. No. 306,868

Claims priority, application Japan, Feb. 24, 1988, 63-41574

Int. Cl.[5] F02M 51/00

U.S. Cl. 364—431.05 **6 Claims**

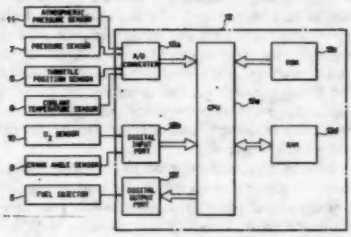
1. In a fuel injection control system for an automotive engine having a fuel injector for injecting a predetermined amount of fuel into said engine, a throttle valve mounted in an intake passage of said engine for controlling air-fuel mixture, an engine speed sensor for detecting engine speed and for producing a corresponding engine speed signal, a throttle position sensor for detecting opening degree of said throttle valve and for producing a corresponding throttle position signal, and a pressure sensor for sensing intake air pressure in said intake passage and for generating a corresponding pressure signal, the improvement in the control system which comprises:

averaging means responsive to said engine speed and said pressure signals for averaging said intake air pressure in

dependency on said engine speed and for producing a corresponding average signal;

estimating means responsive to said engine speed and throttle position signals for estimating pressure in said intake passage for producing a corresponding estimated pressure signal;

determining means responsive to said average signal and said estimated pressure signal for selecting said estimated pressure signal in a transient state of an operating condition of



the engine, and respectively, for selecting said average signal when said operating condition is in a steady state, for producing a set value signal corresponding to each of the transient and steady states; and

a calculator responsive to said engine speed signal and said set value signal for calculating a correct value of said predetermined amount for injecting an optimum amount of said fuel from said fuel injector so as to control said engine without any response delay in all ranges of said operating condition of said engine.

4,959,790

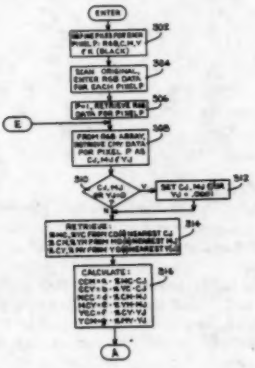
APPARATUS AND METHOD FOR PRODUCING COLOR CORRECTED REPRODUCTION OF COLORED ORIGINAL IMAGES

Fred P. Morgan, Fortson, Ga., assignor to F & S Corporation of Columbus, Georgia, Fortson, Ga.

Filed Jan. 28, 1988, Ser. No. 212,714

Int. Cl.[5] G03F *3/08, 3/10*; G06F *15/68*

U.S. Cl. 364—518 **21 Claims**



12. An apparatus for producing output signals representative of the agent color densities of coloring agents such as process inks or toners, to be used in producing a color-corrected image unit of an initial image unit using the coloring agents, said apparatus comprising:

a processing unit, having memory means for storing selected data therein, for receiving input signals and for producing output signals in response thereto;

means for entering input signals into the processing unit which are respectively representative of color readings of the image to be finally produced using the coloring agents;

said processing unit including

means for determining initial agent color densities that correspond relatively to said color readings entered into said processing unit,

means for retrieving from said memory means previously stored data representative of respective contribution factors corresponding to the contribution to each of the agent colors from each of the other coloring agents,

means for retrieving from the memory means previously stored data representative of certain predetermined nonlinearity correction factors which are representative of the particular coloring agents to be used in producing said image unit,

means for calculating, for each agent color of a respective coloring agent, a contribution amount to each of the other coloring agents as a function of the effected thereon of the respective initial color density, contribution factor, and correction factor;

means for calculating, for each agent color, a final agent color density as a function of its corresponding initial density and the contribution amounts from the other coloring agents, and

means for producing output signals representative of each of said final agent color densities.

4,959,791

CONTROL SYSTEM FOR ENHANCING GRAY TONES OF A DIGITALLY OPERATED PRINTER

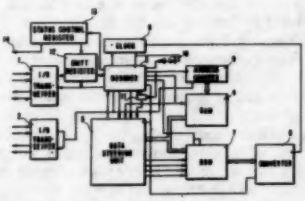
Richard S. Salisbury, Saffron Walden, and Michael R. Prees, Rampton, both of England, assignors to Amansol Enterprises No. 17 Ltd., Gibralter

Filed Feb. 19, 1988, Ser. No. 157,961

Claims priority, application United Kingdom, Feb. 20, 1987, 8704051

Int. Cl.[5] G09G *1/14*

U.S. Cl. 364—519 **11 Claims**



1. A control system for enchancing an image signal in a digitally operated printing system of the kind having a printer mechanism operated by operational digital data signals for printing matrices of dots defining pictures elements, wherein each matrix has a gray tone determined by the pattern of dots in the respective matrix, and image signal generating means for generating such operational digital data signals representative of tonal characteristics of an image to be printed, wherein said control system is connected between the image signal generating means and the printer mechanism to modify the data signals produced by the image signal generating means and to supply modified data signals to the printer mechanism to cause the printer mechanism to print enchanced matrices defining picture elements having enchanced gray tones, said control system comprising an input device to supply a stream to input operational digital data signals from said image signal generating means, and an output device connected to said input device to produce modified operational digital data signals, said input

and output devices being interconnected by a conversion device to identify patterns of predetermined input groups of said input operational digital data signals and to produce therefrom output groups of said modified operational digital data signals corresponding to said enhanced matrices, each such output group having a patter predetermined by the pattern of the corresponding input group and comprising a greater number of digital data signals supplied at a greater rate relative to the corresponding input group.

4,959,792

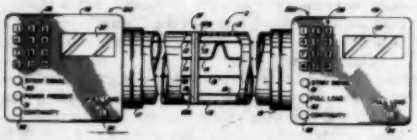
HARNESS INTEGRITY TESTER (HIT)

Thomas P. Sullivan, 10427 W. Calle de Plata, Phoenix, Ariz. 85039

Continuation-in-part of Ser. No. 822,212, Jan. 24, 1986, abandoned. This application Sep. 10, 1987, Ser. No. 95,016

Int. Cl.[5] G05B *23/02*; G01R *19/25*

U.S. Cl. 364—579 **6 Claims**



1. A maintenance systems for detecting, in each of a plurality of generally identical cables, faults which cause intermittent attenuation of electromagnetic radiation transmitted through the cable, each of said cables including a plurality of lines extending the length of the cable, each of said cables having a first end including first connector means and having a second end including second connector means, each of said plurality of lines terminating at said first and second connector means, each of said first and second connector means normally being removably connected to mating means in a system, each of said connector means being disconnected from said mating means during utilization of said maintenance system, said maintenance system including:

(a) a transportable control unit including:

(i) means for attaching said control unit to said first connector means of a selected one of said cables to connect said control unit and the selected cable, and

(ii) control means for selectively directing both a first continuity evaluation quantity of electromagnetic radiation and a second load evaluation quantity of electromagnetic radiation sequentially into each of said lines at said first end of the selected cable, said first continuity evaluation quantity of electromagnetic radiation being relatively minimal in degree by comparison to the amount of electromagnetic radiation normally conducted by each of said lines of the selected cable under normal load conditions and serving merely to confirm that such electromagnetic radiation reaches the second end of the selected cable, said second load evaluation quantity of electromagnetic radiation being relatively similar in degree to the amount of electromagnetic radiation normally conducted by each of said lines of the selected cable under normal load conditions;

(b) a transportable detector unit independent of said control unit and including:

(i) means for attaching said detector unit to said second connector means of the selected cable to connect said detector unit and the selected cable, and

(ii) sensor means for measuring the quantity of electromagnetic radiation reaching said second end of the selected cable in each of said lines when said control means directs said first and second quantities of electromagnetic radiation ifito each of said lines of said first end of the selected cable, said sensor means measuring continuity evaluation fault detection information for each of said lines when said control means directs said first continuity evaluation quantity of electromagnetic radiation sequentially into each of said lines at said first end of the selected cable, said sensor means measuring load evaluation fault detection information for each of said lines when said control means directs said second load evaluation quantity of electromagnetic radiation sequentially into each of said lines at said first end of the selected cable;

(iii) storage means for storing, as continuity evaluation-reference information and load evaluation-reference information for each of said lines, nominal quantities of electromagnetic radiation measured for each of said lines at said second end of a plurality of said identical cables when said first and second quantities of electromagnetic radiation respectively are directed into said lines at said first end of said plurality of identical cables, said storage means including means for recalling said continuity evaluation-reference information and load evaluation-reference information stored therein for each of said lines; and

(iv) comparison means coupled to said sensor means and coupled to said storage means for comparing said load evaluation-fault detection information and continuity evaluation-fault detection information with said recalled reference measurement information and generating load fault-identification information and continuity fault-identification information in response to such comparison.

4,959,793

MICROCOMPUTER HAVING FUNCTION OF GENERATING DATA SIGNALS USED FOR DISPLAYING CHARACTERS

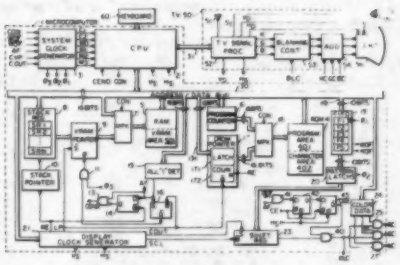
Hiroyuki Suzuki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 21, 1988, Ser. No. 184,567

Claims priority, application Japan, Apr. 22, 1987, 62-100502

Int. Cl.[5] G06F *13/00*

U.S. Cl. 364—900 **10 Claims**



1. A microcomputer comprising:

a memory including a first area storing a plurality of instructions and a second area storing character data,

first means for making access to said first area to read an instruction,

second means for executing said instruction read from said first area, said second means including means for generating a character display command signal by executing said instruction read from said first area, said character display command signal changing between a first state and a second state in a predetermined cycle,

third means, including first storage means, for temporarily storing address information for reading said character data from said second area,

fourth means, responsive to said character display command signal, for coupling said first means to said memory to allow said first means to read said instruction from said

first area when said character display command signal is in said first state and for coupling said third means to said memory to allow said third means to access said second area when said character display command signal is in said second state, said character data being read from an address location in said second area designated by said address information when said access to said second area is allowed,

second storage means for temporarily storing character data read from said second area, and

fifth means for receiving character data stored in said second storage means in response to a character data output command signal and for shifting received character data in response to a shift clock,

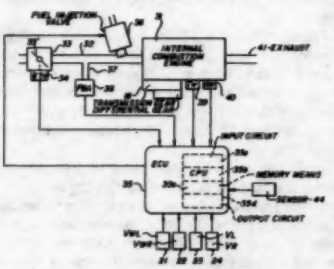
wherein said second means suspends execution of instructions during a term in which said character display command signal is in said second state and resumes execution of instructions in response to a change of said character display command signal to said first state.

4,959,794

DRIVING WHEEL SLIP CONTROL DEVICE

Shuji Shiraishi, Wako, Hironobu Kiryu; Takashi Nishihara; Naoki Omomo and Makoto Sato, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 5, 1988, Ser. No. 279,693
Claims priority, application Japan, Oct. 12, 1987, 62-314589
Int. Cl.[5] B60K *31/00*
U.S. Cl. 364—426.03 7 Claims



1. A driving wheel slip control device comprising:

a driving wheel velocity sensor means for detecting velocity of a driving wheel of a vehicle;

a vehicle velocity means for detecting velocity of the vehicle;

an engine revolutional number sensor means for detecting number of revolutions of an engine of the vehicle;

a slip detecting means, connected to said driving wheel velocity sensor means, for detecting a state of slip of the driving wheel according to an output from said driving wheel velocity sensor means;

an engine output reducing means, connected to said slip detecting means, for reducing an output of the engine in accordance with an output from said slip detecting means;

a prohibition region determining means, connected to said vehicle velocity sensor means and said engine revolution number sensor means, for determining a control prohibition region in accordance with velocity of the vehicle and number of revolutions of the engine; and

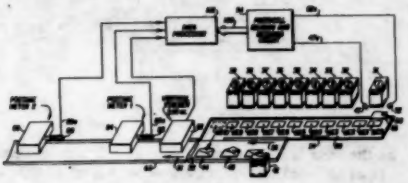
a prohibition means, connected to said engine output reducing mean and said prohibition region determining means, for prohibiting said engine output reducing means from operating to reduce an output of the engine when an output from said vehicle velocity sensor or engine revolutional number sensor is in said control prohibition region.

4,959,795

INSERTION MACHINE WITH DISTRIBUTED CHARGEBACK

Dean Christensen, St. Louis, Mo.; David J. Helffrich, Bethlehem, Pa.; Christopher K. Scullion, Catasauqua, Pa., and Edward W. Hindle, Whitehall, Pa., assignors to Bell & Howell Company, Chicago, Ill.

Continuation-in-part of Ser. No. 6,853, Jan. 27, 1987, Pat. No. 4,797,830, which is a continuation of Ser. No. 818,389, Jan. 13, 1986, Pat. No. 4,639,873, which is a continuation of Ser. No. 576,839, Feb. 3, 1984, abandoned. This application Jan. 9, 1989, Ser. No. 294,726
Int. Cl.[5] G07B *17/02*
U.S. Cl. 364—464.03 22 Claims



1. A machine of the type in which a plurality of feed stations feed items onto an insertion track for inclusion with an associated group of items, wherein the improvement comprises:

means for designating at least one of said feed stations as a primary feed station;

means for designating at least two of said feed stations as chargeback feed stations;

processing means including memory means and arithmetic logic means;

means including said processing arithmetic logic means for using values indicative of the per item weight of items held in said primary feed station and said chargeback feed stations to obtain a calculated total weight with respect to a group of items;

means for using said calculated total weight to determine a postage category in which said group of items is to be classified;

means for determining whether the feeding from at least one chargeback station requires that said group of items be classified in a higher postage category than than in which said group otherwise would have been classified; and

means for apportioning, among the chargeback feed stations which fed items for inclusion with said group, the increase in postage cost occassioned by the classification of said group in said higher postage category.

4,959,796

METHOD OF PRODUCING ANALYTICAL CURVE

Seiji Hidaka; Takashi Ishihara, both of Tachikawa; Takehiko Hamaguchi, Hachioji; Nobuaki Sugiyama, Hino, and Kosuke Toura, Hachioji, all of Japan, assignors to Konica Corporation, Tokyo, Japan

Filed Nov. 9, 1988, Ser. No. 268,928
Claims priority, application Japan, Nov. 10, 1987, 62-283763
Int. Cl.[5] G06F *15/42*
U.S. Cl. 364—497 13 Claims

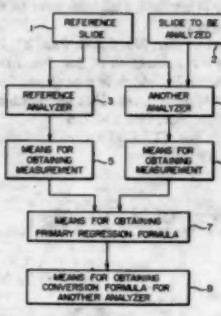
1. A method of producing an analytical curve for an analyzing apparatus, the apparatus providing an analysis result on the basis of said analytical curve in response to a measurement value obtained by photoelectrically measuring light intensity reflected from a slide to be analyzed, the method comprising the steps of:

measuring a plurality of reference slides by using a first analyzing apparatus which has a predetermined analytical curve, thereby obtaining a plurality of first measurement values and providing a plurality of first analysis results;

measuring said plurality of reference slides by using a second

analyzing apparatus, thereby obtaining a plurality of second measurement values; and

producing an analytical curve for said second analyzing apparatus to provide a plurality of second analysis results


REFERENCE SLIDE
SLIDE TO BE ANALYZED
REFERENCE ANALYZER
ANOTHER ANALYZER
MEANS FOR OBTAINING MEASUREMENT
MEANS FOR OBTAINING MEASUREMENT
MEANS FOR OBTAINING PRIMARY REGRESSION FORMULA
MEANS FOR OBTAINING CONVERSION FORMULA FOR ANOTHER ANALYZER

on the basis of a relation between said first measurement values and said second measurement values so that said plurality of second analysis results correspond to said plurality of first analysis results.

4,959,797

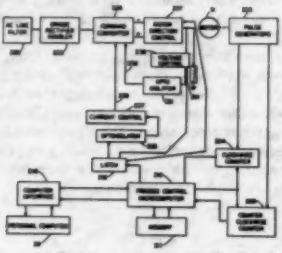
SYSTEM FOR TIGHTENING THREADED FASTENER ASSEMBLIES

James L. McIntosh, Westminster, Colo., assignor to Tensor Development, Inc., Westminster, Colo.

Continuation-in-part of Ser. No. 805,719, Dec. 6, 1985, abandoned, and a continuation-in-part of Ser. No. 131,991, Dec. 11, 1987, Pat. No. 4,891,764. This application Mar. 18, 1988, Ser. No. 169,974

Int. Cl.[5] G05D *13/02, 17/02;* G05F *1/10*

U.S. Cl. 364—508 **39 Claims**



1. A system for the tightening of threaded fastener assemblies comprising:

a driveshaft having an adapter on one end for receiving a tool for receiving and rotating a threaded fastener;

a direct current electric motor having a shaft connected to said driveshaft, said motor being operable in the current mode to control the force applied to the shaft thereof by varying the current through the windings;

means mounted to said motor shaft for rotation therewith and for providing an output signal indicative of the rotary position of said shaft with respect to a reference position, said means for providing an output signal including:

optical encoder means operably connected to said shaft of said electric motor for rotation therewith;

means responsive to movement of said encoder means for producing a train of output pulse patterns; and

counter means connected to said output pulse pattern producing means for maintaining a value indicative of the displacement of said shaft;

a clock for providing timing pulses;

current regulator means connected to windings of said motor; and

processor means responsive to said output signals and to said timing pulses for controlling the output of said regulator and varying the current through the windings of said motor to provide a preprogrammed value of force exerted by the shaft of said motor and, thereby, the force exerted by said drive shaft in rotating a fastener to tighten it upon a threaded receiving means, said processor means includes a microprocessor responsive to both a predetermined value in said counter means and to the force exerted upon said driveshaft by said motor shaft exceeding a preselected value for interrupting the current from said current regulator means to the windings of the motor.

8. A method for determining the value of an unknown torque opposing the rotation of a tool driveshaft for tightening of a threaded fastener assembly which driveshaft is connected to the shaft of an electric motor of the type in which the force applied to the shaft is a linear function of the current through the motor, comprising:

supplying current to the motor with a current mode controlled regulator having a plurality of discrete selectable current values;

producing signals indicative of the direction and extent of the movement of the driveshaft of the tool;

providing regular periodic timing pulses;

providing a program controlled processor for receiving said driveshaft movement signals and said timing pulses;

periodically calculating from said driveshaft movement signals and said time pulses the acceleration of the driveshaft;

calibrating the motor of the tool by calculating driveshaft acceleration values with no load and a resistance torque of known value for a plurality of discrete current values being supplied to the motor to determine the torque applied to a threaded fastener by the driveshaft of the motor for each of said discrete selectable current values from the regulator;

performing said calculations using said processor;

varying the current supplied by the regulator to the motor with the resistance torque of unknown value connected to the driveshaft thereof until the acceleration of the driveshaft is about zero and determining the value of the unknown torque form the current value at that point; and

controlling said current regulator using said processor to vary the current delivered to the motor in accordance with said calculations.

4,959,798

ROBOTIC TELEVISION-CAMERA DOLLY SYSTEM

Gary B. Gordon, Saratoga, Calif., and Robert R. Gonnelli, Valley Cottage, N.Y., assignors to Total Spectrum Manufacturing Inc., Valley Cottage, N.Y.

Filed Jun. 23, 1988, Ser. No. 228,933

Int. Cl.[5] F16M *3/00*

U.S. Cl. 364—513 **13 Claims**

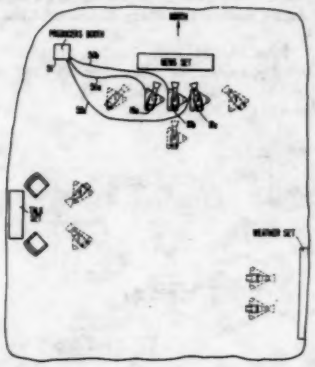
1. A positioning system for moving a dolly member between first and second positions in a plane, said dolly member having an axis of rotation normal to the plane and a reference direction normal to said axis of rotation, said dolly member further including first means for the translation thereof in the plane and second means for the rotation thereof about said axis of rotation, the system comprising:

first and second target means having fixed locations relative to the first and second positions on said plane respectively, each of said target means having an origin defining its respective position and reference means defining a given direction in the plane;

first control means coupled to said first means for translating said dolly member, said first control means controlling the

translation of said dolly member along a predetermined path from said first position to a position at which the axis of rotation of said dolly member is in the vicinity of said second position;

detecting means for generating first and second control signals, said first control signal corresponding to the non-coincidence of the axis of rotation of said dolly member with the origin of said second target means and said second control signal corresponding to the non-coincidence of the reference direction of said dolly member with the given direction defined by said second target means; and



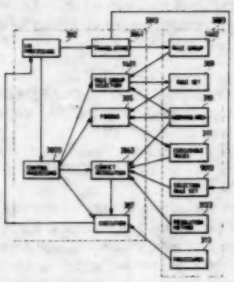
second control means coupled to said first and second means for translating and rotating respectively said dolly member, said second control means being responsive to said first and second control signals for controlling the translation of said dolly member to bring the axis of rotation thereof into coincidence with the origin of said second target means and controlling the rotation of said dolly member to bring the reference direction thereof into coincidence with the given direction defined by said second target means.

4,959,799

INFERENCE METHOD AND SYSTEM

Hiroshi Yoshiura; Takeshi Chusho, both of Yokohama; Shoichi Masui, Kawasaki, and Hideo Obata, Machida, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 3, 1988, Ser. No. 266,898
Claims priority, application Japan, Nov. 5, 1987, 62-279878
Int. Cl.[5] G05B 15/18
U.S. Cl. 364—513 **19 Claims**



1. In an inference machine having knowledge set memory means for storing a set of knowledge items therein, and inference means for interpreting the knowledge items for execution, an inference method comprising the steps of:

(a) storing a plurality of series of priority level information items which set precedence degrees among the knowledge items within the knowledge set;

(b) designating one of the plurality of series of priority level information items; and

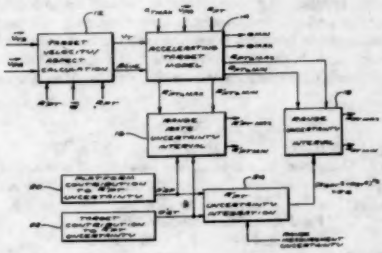
(c) selecting one knowledge item on the basis of the priority level information series designated by the designating step, in a case where a plurality of available knowledge items exist when said inference means interprets the knowledge items for execution.

4,959,800

METHOD AND APPARATUS FOR DETERMINING THE POSITION AND VELOCITY OF A TARGET IN INERTIAL SPACE

Richard L. Woolley, Canoga Park, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 20, 1988, Ser. No. 197,015
Int. Cl.[5] G01S 13/06
U.S. Cl. 364—516 **10 Claims**



1. A method for determining the position and velocity of a target in inertial space including the steps of:

(a) tracking the target and providing three orthogonal velocity components in inertial space;

(b) computing the scalar velocity V_T of the target in an inertial reference frame by providing the square root of the sum of the squares of the orthogonal velocity components;

(c) computing the aspect angle cue of the target relative to a line-of-sight to a platform as an inverse sinusoidal function of the ratio of one of said orthogonal components and V_T, when such tracking data is available, and otherwise;

(d) estimating actual target maneuver to develop a minimum uncertainty zone using an assumed worst case lateral target acceleration; and

(e) aiming an antenna at said determined positioned of said target.

4,959,801

OUTLINE-TO-BITMAP CHARACTER GENERATOR

Philip G. Apley, Allston; David A. Berlow, and John S. Collins, both of Boston, all of Mass., assignors to Bitstream Inc., Cambridge, Mass.

Continuation of Ser. No. 827,239, Feb. 7, 1986, Pat. No. 4,785,391. This application Oct. 14, 1988, Ser. No. 257,636
The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.
Int. Cl.[5] G06F 3/14
U.S. Cl. 364—518 **8 Claims**

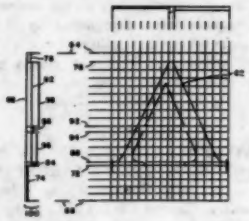
1. A digital font for use in generating a bitmap representation of a selected character from a digital representation of the

outline of said character, comprising, in a digital storage medium having a plurality of locations capable of storing digital information:

a first set of storage locations containing data representing a hierarchy of x-oriented zones, each such zone corresponding to a typographic feature of the character;

a second set of storage locations containing data representing a hierarchy of y-oriented zones, each such zone corresponding to a typographic feature of the character; and

in each of the first and second sets of storage locations, the data representing the respective hierarchies of x-oriented zones and y-oriented zones including data representing the number of zones in each respective hierarchy and, for each zone in the hierarchy, data defining a zone definition comprising parameter values descriptive of said zone.



4,959,802

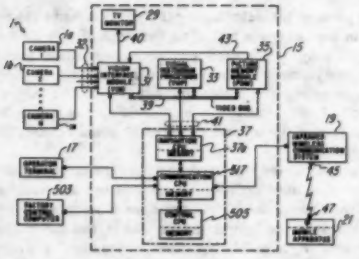
VIDEO BUS FOR A VISION SYSTEM

John E. Slaughter, Richardson, and Robert B. Terrell, Garland, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Aug. 30, 1985, Ser. No. 771,545

Int. Cl.[5] G06F *15/20, 15/46*

U.S. Cl. 364—521 **9 Claims**



1. A video control system comprising:

a vision interface module for converting analog video data to digital video data;

a visual histogram processor module for generating video histograms of at least a portion of the digital video data output by the vision interface module;

said histogram processor module including a window generator for reducing the quantity of video data for subsequent image processing;

a picture memory module for storing the digital video data from the vision interface module, including means for converting said data from gray scale information to black and white coded information;

a video bus connecting the three modules and for passing control signals and the digital video data from the vision interface module to the other two modules, wherein said control signals include a pixel clock signal for triggering the conversion in the vision interface module of analog video data to digital video data, and for use by the window generator in generating a window;

a horizontal synch signal for use by the picture memory module in generating a horizontal address of a pixel location; and

a vertical synch signal for use by the picture memory module in generating a vertical address of a pixel location.

4,959,803

DISPLAY CONTROL SYSTEM

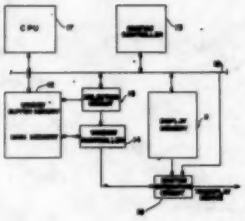
Toshimi Kiyohara, Nara, and Toshiya Morita, Yamatokoriyama, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jun. 24, 1988, Ser. No. 210,855

Claims priority, application Japan, Jun. 26, 1987, 62-160574

Int. Cl.[5] G06F *3/153*

U.S. Cl. 364—521 **3 Claims**



1. A display system comprising:

a display;

display bit-map memory means for storing memory elements corresponding to picture elements of said display;

window buffer memory means for storing image data comprising sentences, graphics and charts to be displayed on said display;

transfer control means coupled to said window buffer memory means and said display bit-map memory means for controlling transfer of said stored image data from said window buffer memory means to said display bit-map memory means; and

selection means coupled to said display bit-map memory means for allowing a user to select for operation one of a display mode or a writing mode,

wherein said display system, in response to said selection means, is operable in said display mode wherein said stored image data is directly transferred to said display and displayed overlapping said stored memory elements and is operable in said writing mode wherein said stored image data is transferred by said transfer control means to said display bit-map memory means to be displayed.

4,959,804

PARAMETER MEASURING APPARATUS

Richard S. Willing, Granada Hills, Calif., assignor to Baxter International Inc., Deerfield, Ill.

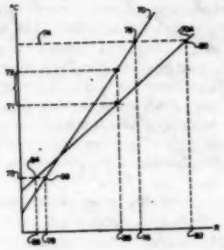
Filed Jul. 12, 1988, Ser. No. 217,806

Int. Cl.[5] G01K *7/00*; G06F *15/20*

U.S. Cl. 364—557 **16 Claims**

1. A parameter measuring apparatus comprising a constant signal means for providing a first constant output signal, said constant output signal means including sensor means for sensing and measuring a parameter and first and second stable passive reference means respectively defining a high parameter limit and a low parameter limit of said sensor means, wherein said sensor means has a known response to the parameter over a parameter range defined by said high parameter limit and said

low parameter limit; sampling means coupled to said constant output signal means for sampling said first constant output signal means for sampling said first constant output signal and providing a second output signal; first switching means coupled to said constant signal means for selecting said sensor means or one of said passive reference means in said constant signal means; second switching means coupled to said constant output signal means and to said sampling means for minimizing an internal resistance of said first switching means and its effect



upon the first constant output signal provided to said sampling means; and calculator mans coupled to said sampling means and responsive to said second output signal for storing and comparing said known response of said sensor means with said second output signal and calculating and providing a corrected output signal accurately representing the measured parameter, wherein said calculator means is operative to selectively actuate said first and second switching means for selectively coupling said calculator means to said sensor means and said first and second passive reference means.

4,959,805

COORDINATE DETECTING DEVICE

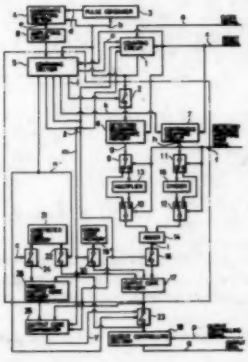
Junichi Ohouchi; Hiroaki Sasaki, and Kazuo Hasegawa, all of Furukawa, Japan, assignors to Alps Electric Co., Ltd., Tokyo, Japan

Filed Jan. 5, 1988, Ser. No. 141,118

Claims priority, application Japan, Mar. 17, 1987, 62-62157; Mar. 17, 1987, 62-62158; Mar. 17, 1987, 62-62159; Mar. 17, 1987, 62-62160; Mar. 17, 1987, 62-62161

Int. Cl.[5] **G09G** *1/28;* **G08C** *21/00*

U.S. Cl. 364—562 **15 Claims**



12. A coordinate detecting device responsive to coordinate input operations for providing to a host computer coordinate values comprising:

a counting circuit for providing at an output a series of counter values, having at least one reset signal input terminal, which, when when receiving a reset signal resets the counter to its beginning value and restarts said counting circuit;

a coordinate detecting section having a counter receiving input for receiving counter values from said counting circuit and for effecting scanning of a plurality of sensing elements driven one after another depending on the counter value outputted by said counting circuit, and detecting a coordinate input operation of the basis of said counter values received from said counting circuit, including a means for providing at an output a detection signal indicating the detection of a coordinate input operation;

means coupling the output of said counting circuit to said counter receiving input of said coordinate detecting section;

detection presence/absence judging means having an input for receiving detection signals from said coordinate detecting section and including means for detecting the receipt of a detection signal and providing at an output terminal a detection presence/absence signal which indicates that a coordinate input operation has been performed;

means coupling the output of said coordinate detecting section to said detection signal receiving input of said detection presence/absence judging means;

scan termination judging means having an input coupled to the output of said counting circuit for receiving counter values from said counting circuit and including means for judging the termination of a scan on the basis of said counter values from said counting circuit, and means for providing at an output terminal a scan termination signal when a scan is judged to be terminated;

detection presence/absence signal processing means, having a first input terminal coupled to said output terminal of said detection presence/absence judging means for receiving detection presence/absence signals, said detection presence/absence signal processing means, including circuit means for providing at a first output terminal a detection sensing signal indicating receipt of at least one detection presence/absence signal, said detection presence/absence signal processing means further including circuit means for providing at a second output terminal a series sensing signal in response to receipt of a plurality of uninterrupted detection presence/absence signals from said detection presence/absence judging means, said detection presence/absence signal processing means having a second input coupled to said output of said scan termination judging means for receiving scan termination signals, said detection presence/absence processing means further including circuit means for resetting said detection presence/absence processing means at the end of said scan;

coordinate value obtaining means having an input coupled to the output of said counting circuit for selectively receiving counter values from said counting circuit, said coordinate value obtaining means having an input coupled to said first output of said detection presence/absence processing means for receiving said detection sensing signal, said coordinate value obtaining means including circuit means responsive to receipt of said detection sensing signal to couple the counter value to said coordinate value obtaining means and including means for processing counter value received from said counting circuit to arrive at a signal representative of a coordinate value and generating signals representative of coordinate values, said coordinate value obtaining means further including means for selectively providing at an output terminal, upon the receipt of a coordinate value outputting control signal at an outputting control signal terminal, a signal representative of a coordinate value;

coordinate memory means having an input terminal coupled to the output terminal of said coordinate value obtaining means for receiving signals representative of coordinate values from said coordinate value obtaining means, and

storing only the most recently received signal, said coordinate memory means providing at an output terminal, the signal representative of the coordinate value stored in said coordinate memory means;

detection signal memory means for receiving and storing a detection status signal indicating that a coordinate input operation has occurred, said detection signal memory means having a detection status signal receiving input terminal, and providing at an output terminal a detection signal status signal which indicates whether a coordinate input operation has occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer;

comparing means including a preceding coordinate value memory means for storing a signal representative of the last coordinate value sent by said coordinate detecting device to said host computer, said comparing means having a first input terminal for receiving a signal representative of the last coordinate value sent by said coordinate detecting device to said host computer and having a second input terminal for receiving a signal representative of a coordinate value from said coordinate value obtaining means output terminal representing an indication that no detection signal has been received by said detection presence/absence judging means, said signal is provided to said preceding coordinate value memory means when a host computer reset signal is provided to said coordinate detecting device, said preceding coordinate value memory means further having a first preceding coordinate value means input terminal coupled to said coordinate value obtaining means output terminal, said preceding coordinate value memory means having a second preceding coordinate value means input terminal coupled to said coordinate detecting device output terminal which provides an output to said host computer, said comparing means having an output comparator which receives a signal representative of the signal stored in the preceding coordinate value memory means at a first input terminal, said comparing means output comparator having a second input terminal coupled to said coordinate memory means output terminal for receiving the signal representative of the coordinate value stored in said coordinate memory means, and said output comparator compares said signal representative of a coordinate value stored in said preceding coordinate value memory means with the signal representative of a coordinate value stored in said coordinate memory means and provides at an output terminal of said output comparator a signal for controlling the output of the last signal representative of a coordinate value last stored in said coordinate memory means to said host computer when said comparing means output comparator determines that said signal representative of a coordinate value stored in said coordinate memory means is different than said signal representative of a coordinate value stored in said preceding coordinate value memory means and when a comparing means controlling input signal is received at an input terminal of said output comparator causing said comparing means output comparator signal to be generated to permit said signal representative of a coordinate value stored in said coordinate memory means to be outputted to said host computer;

operation controlling means, including status generating circuitry for generating a detection status signal in response to receipt of a series sensing signal, said operation controlling means having an output terminal coupled to said counting circuit reset input terminal, an input terminal coupled to said scan termination judging means output terminal, having an input coupled to said detection signal series sensing signal output terminal, an output terminal for providing said detection status signal, an input terminal coupled to said output terminal of said detection signal memory means, an output terminal coupled to said coordinate value outputting control signal terminal, and an output terminal at which a coordinate memory means output controlling signal is provided, said operation controlling means further including control circuitry for providing control signals upon receipt of each said scan termination signal, said control circuitry providing a reset signal to said counting circuit if no series sensing signal was received and no coordinate input operation has occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer, said circuitry further providing a reset signal to said counting circuit, providing a coordinate value outputting control signal, providing a detection status signal, and providing a comparing means controlling input signal, if a series sensing signal was received, and said control circuitry providing a coordinate memory means output controlling signal and providing an output signal to cause said coordinate value stored in said coordinate memory means to be outputted, if no series sensing signal was received and at least one coordinate input operation had occurred since the time a previous coordinate value was provided from said coordinate detecting device to said host computer; and

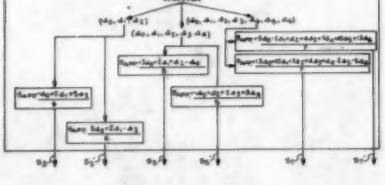
outputting means, including at least one control terminal, for selectively coupling said coordinate memory means output terminal to said host computer, and providing an input signal to said host computer in response to receipt of said coordinate memory means output controlling output signal from said output controlling means, at said at least one control terminals, and further providing an input signal to said host computer in response to receipt of said comparing means output comparator signal from said comparing means output comparator at said at least one control terminal, said at least one control terminal being coupled to said said coordinate memory means output controlling output terminal of said operation controlling means and said output comparator signal terminal of said comparing means output comparator.

4,959,806

APPROXIMATED ROTATIONAL SPEED SIGNAL FOR SHIFTING TRANSMISSION

Gary L. Gold, Schoolcraft, Mich., assignor to Eaton Corporation, Cleveland, Ohio

Filed Oct. 24, 1988, Ser. No. 261,448
Int. Cl.[5] G01P 3/00
U.S. Cl. 364—565 **15 Claims**



1. A linear method for determining approximate mean rotational speed of a rotating member for controlling shifting points of a vehicular transmission, said method including the steps of:

(a) determining a desired array of linear equivalents for the equation:

$$S_{(approx.)} = \frac{\Sigma I_n S_n}{\Sigma I_n^2}\left(\frac{N-1}{2}\right) + \frac{\Sigma S_n}{N}$$

Wherein N is an odd whole integer greater than one and equals the number of speed measurements taken within a predetermined time period T;

t_n equals selected incremental time periods within time period T at which rotational speed s_n of the rotating member is measured such that $t_n=t_0, t_1, t_2, t_3 \ldots$ and $(t_1-t_0)=(t_2-t_1)=(t_3-t_2 \ldots;$

s_n are the individual speed measurements taken within time period T where $s_n=s_1,s_2,s_3 \ldots s_n;$

$(N-1/2)$ is the even number of speed measurements on opposite sides of an orthogonal axis whose origin is located at the middle value of t_n and whose ordinate is speed and whose abscissa is time and for which t_n has the value of zero at the origin with values of t_n having opposite signs on opposite sides of the ordinate and the value of s_n is positive in all quadrants;

(b) selecting a desired linear equivalent for $S_{(approx.)}$ from the array of step (a),

(c) measuring and providing signals indicative of the rotational speed values s_n of the rotating member according to the linear equivalent selected for $S_{(approx.)}$ at step (b);

(d) determining $S_{(approx.)}$ by processing the speed signals of step (c) according to the linear equivalent selected therefor at step,

(e) providing a signal corresponding to S(approx.) step (d), and

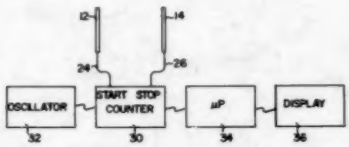
(f) controlling the shifting points of the transmission with the signal of step (e).

4,959,807

DEVICE FOR MEASURING THE SPEED OF A MOVING OBJECT

Mitchell L. Thomspon, Exton; Kyung T. Park, Upper Darby; Kumar Ogale, Philadelphia, and William B. Powers, Exton, all of Pa., assignors to Atochem North America, Inc., Philadelphia, Pa.

Filed Oct. 11, 1988, Ser. No. 255,932
Int. Cl.[5] G01P 3/66
U.S. Cl. 364—565 **16 Claims**



1. Apparatus for measuring speed of a moving object, comprising:

(a) first impact detection means disposed in a path of movement of the object including a piezoelectric film transducer for generating an electrical signal upon an impact on the first impact detection means;

(b) second impact detection means, disposed in the path of movement of the object, parallel to and separated by a preselected distance from the first impact detection means including a transducer for generating an electrical signal upon an impact on the second impact detection means, the respective signals from the first and second impact detection means being separated by a time interval representative of the preselected distance;

(c) means responsive to the respective signals from the first and second impact detection means for measuring the time interval between the respective signals; and

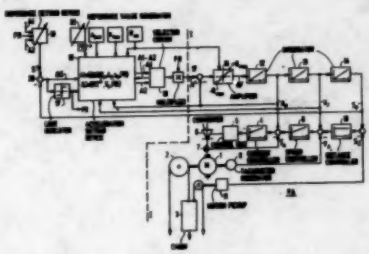
(d) computing means for computing the speed of the object from the time interval.

4,959,808

METHOD AND APPARATUS FOR THE DISTANCE CONTROL OF A POSITIONING DRIVE

Ingomar Neuffer, Erlangen, and Christian Keller, Nuremberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Apr. 18, 1968, Ser. No. 182,847
Claims priority, application Fed. Rep. of Germany, Apr. 18, 1987, 3713271
Int. Cl.[5] G01P 15/00; B66B 1/24
U.S. Cl. 364—566 **8 Claims**



1. A method for providing a stepwise, acceleration and velocity limited travel distance control for a positioning drive having a subordinated velocity control where an acceleration value, a controlled velocity reference value and a distance reference value of the positioning drive are controlled with multiple time integration of a step value, an amplified difference between an acceleration reference value and a time integral of the step value being limited in maximum magnitude to form the step value, comprising the steps of:

forming a first alternative acceleration reference value as a function of a residual travel distance with which the positioning drive would not go beyond a predetermined point that is located at a given travel distance ahead of a predetermined stopping point using constant deceleration;

forming a second alternative acceleration reference value as a function of the controlled velocity reference value with which the positioning drive can be brought to a determinable velocity without overshoot;

limiting the second alternative acceleration reference value between the limits for the acceleration and deceleration as a function of the controlled velocity reference value and a travel direction signal according to the relationship:

$$A2 = \sin(V2^* - FR \cdot V_f) \cdot \sqrt{|V2^* - FR \cdot V_f| \cdot 2 \cdot R_{max}}$$

where R_{max} represents the maximum step value and $V2^*$ is a predeterminable velocity value which is set to the value zero when the first alternative acceleration reference value becomes smaller than zero; and

selecting with a selection circuit, at each of a number of possible stopping points, either said first or second alternative acceleration reference values according to the following:

using the second alternative acceleration reference value once motion has started;

using the first alternative acceleration reference value to initiate destination braking; and

using the second alternative acceleration reference value for approaching the predetermined stopping point if the positioning drive has reached a point that is located four times the value of the given travel distance ahead of the predetermined stopping point.

4,959,809

MULTIPLE SENSOR POSITION LOCATING SYSTEM

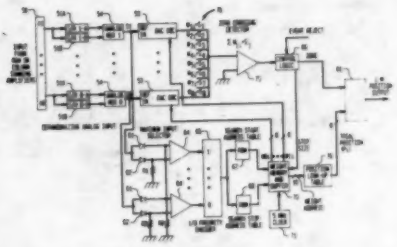
W. Leslie Rogers, and Neal H. Clinthorne, both of Ann Arbor, Mich., assignors to The University of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 876,762, Jun. 20, 1986, Pat. No. 4,852,056, and a continuation-in-part of Ser. No. 196,928, May 20, 1988. This application Dec. 28, 1988, Ser. No. 322,095

The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.

Int. Cl.[5] G06F *15/20*; G01T *1/20*

U.S. Cl. 364—581 **11 Claims**



1. A system for locating a position of a source of a detectable emittance, the system comprising:

a plurality of sensors arranged in a predetermined configuration with respect to one another, each for detecting the detectable emittance and producing at an associated output thereof a respective sensor signal having a sensor signal value which is substantially responsive to the detectable emittance impinging on said associated sensor;

memory means for storing a plurality of weighting values, each associated with a respective one of said sensors, said weighting values being responsive to a sensor response characteristic of said associated one of said sensors and corresponding to a predetermined distance value;

means for searching said memory means and selecting at least one of said weighting values, within a predetermined range of memory addresses;

arithmetic combiner means having a first input for receiving at least one of said sensor signals, and a second input for receiving a weighting value from said memory means, for producing at an output thereof a composite weighted signal having a composite weighted signal value responsive to said sensor signal value and said weighting value; and

position encoder means for producing a position value responsive to a composite weighted signal value, said position value corresponding to the a maximum likelihood position estimate of the detectable emittance.

4,959,810

UNIVERSAL REMOTE CONTROL DEVICE

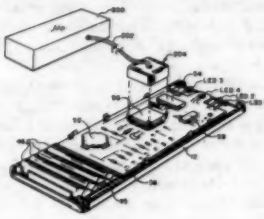
Paul V. Darbee, Santa Ana; Richard E. Ellis, Garden Grove; Louis S. Jansky, Long Beach, and Avram S. Grossman, Santa Ana, all of Calif., assignors to Universal Electronics, Inc., Tustin, Calif.

Continuation-in-part of Ser. No. 109,336, Oct. 14, 1987, abandoned. This application Dec. 2, 1987, Ser. No. 127,999

Int. Cl.[5] H04B *9/00*; G08C *19/00*; H04Q *1/00*

U.S. Cl. 364—900 **38 Claims**

1. In a universal remote control system having input means for inputting commands, signal output means for supplying an infrared signal to a controlled device and a central processing unit (CPU) coupled to said input means and to said signal output means, the improvement residing in said system comprising no ROM, a single non-volatile, read-write RAM coupled to said central processing unit and data coupling means including terminal means coupled to the CPU for enabling new code data to be supplied from outside the system to, or retrieved from, said RAM through said terminal means and the CPU.



4,959,811

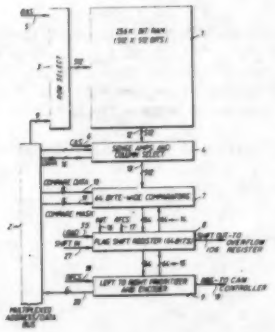
CONTENT ADDRESSABLE MEMORY INCLUDING COMPARISON INHIBIT AND SHIFT REGISTER CIRCUITS

Andre Szczepanek, Bedford, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Nov. 3, 1986, Ser. No. 926,433

Int. Cl.[5] G11C *15/04*

U.S. Cl. 365—49 **16 Claims**



1. A content addressable memory including comparison inhibit and shift register circuits comprising: memory means having a plurality of storage elements accessible in blocks, each block including the same number of elements in a plurality of equal groups in a particular order; comparator means having a plurality of comparators respectively corresponding to the groups in each block, each comparator having first and second sets of inputs, each set equal in number to the elements in a group, and producing a match indication as to whether or not the groups of data bits applied to the sets of inputs are the same, means storing an input key code consisting of a plurality of groups of data bits, each group of data bits having the same number of data bits as there are storage elements in a group; control means for selectively accessing a block of storage elements in the memory means so that the data bits stored therein are simultaneously applied to the first set of inputs of respective ones of the comparators, and for applying a group of data bits from an input key code simultaneously to the second set of inputs of each comparator, characterized in that there is provided flag register means having storage elements respectively corresponding to the comparators of the comparator means, the match indications from the comparators being stored in the storage elements of the flag register means, the

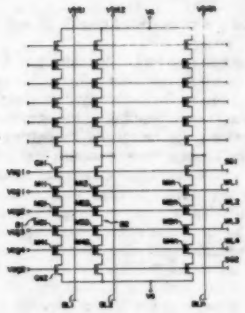
control means being arranged to apply the groups of data bits from the input key code in succession in a predetermined order to the second set of inputs of each comparator, each comparator including means for disabling itself following a comparison of an immediately preceding group of data bits from the input key code, where that comparison produced, from the next adjacent comparator earlier in the particular order, an indication that the groups did not match; output means responsive to a positive match indication from the comparators following a comparison with the final group of data bits from the input key code to identify the location in the accessed block of groups of data bits matching the input key code.

4,959,812

ELECTRICALLY ERASABLE PROGRAMMABLE READ-ONLY MEMORY WITH NAND CELL STRUCTURE

Masaki Momodomi; Fujio Masuoka, both of Yokohama; Riichiro Shirota; Yasuo Itoh, both of Kawasaki; Kazunori Ohuchi, and Ryouhei Kirisawa, both of Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1988, Ser. No. 289,702
Claims priority, application Japan, Dec. 28, 1987, 62-329781
Int. Cl.[5] G11C *17/00*
U.S. Cl. 365—185 15 Claims



1. A non-volatile dynamic semiconductor memory device comprising:

(a) a semiconductive substrate having a major surface;

(b) a semiconductive well region formed in said surface of said substrate, said well region being provided separate from a well region in which transistors are formed to constitute a peripheral circuit of said memory device;

(c) parallel bit lines provided above said substrate;

(d) rewritable memory cells connected to said bit lines, said memory cells comprising NAND cell blocks each of which has a series array of memory cell transistors, each of said memory cell transistors having a charge accumulation layer, a control gate and semiconductive layers formed in said well region to function as sources and drains, and said well region functioning as a surface breakdown prevention layer; and

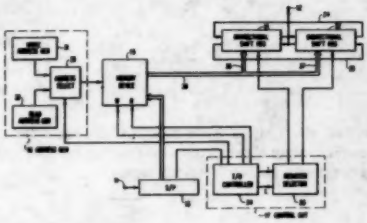
(e) control means for writing data into memory cells of a selected NAND cell block sequentially during a data write mode subsequent to the data erase mode, said control means applying, when a certain memory cell of said selected NAND cell block is subjected to writing, to said control gate of said certain memory cell a voltage to form such a strong electric field as to allow the transfer of charges between said charge accumulation layer of said certain memory cell and said well region.

4,959,813

SERIAL INPUT-OUTPUT CIRCUIT FOR FORWARD AND BACKWARD PRODUCING BITS FROM BIDIRECTIONAL SHIFT REGISTERS

Toshiya Todoroki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Apr. 14, 1989, Ser. No. 338,070
Claims priority, application Japan, Apr. 14, 1988, 63-92831
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—189.12 4 Claims



1. In a serial input-output circuit comprising an input shift register supplied with an input serial bit sequence for producing a sequence of output bit groups, each consisting of a first predetermined number of parallel bits, a memory device for memorizing said output bit groups as memorized bit groups, and output means connected to said memory device for producing a predetermined part of said memorized bit groups as an output serial bit sequence selectively forwardly and backwardly of said input serial bit sequence, the improvement wherein said output means comprises:

first and second bidirectional shift registers, each for one of said memorized bit groups;

storing means connected to said memory device and said first and said second bidirectional shift registers for bit parallel storing the parallel bits of a selected one of said memorized bit groups as partial held bits in a selected one of said first and said second bidirectional shift registers;

shifting means for bidirectionally shifting through said first and said second bidirectional shift registers total held bits held in said first and said second bidirectional shift registers; and

producing means connected to one of said first and said second bidirectional shift registers for producing a second predetermined number of the total held bits in bit series as said predetermined part of the memorized bit groups.

4,959,814

SENSING DETECTION CIRCUIT IN DYNAMIC RANDOM ACCESS MEMORY

Soo I. Cho, Seoul, and Si D. Choi, Suwon, both of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon, Rep. of Korea

Filed Dec. 28, 1988, Ser. No. 290,991
Claims priority, application Rep. of Korea, Mar. 17, 1988, 88-2801
Int. Cl.[5] G11C *7/00*
U.S. Cl. 365—207 4 Claims

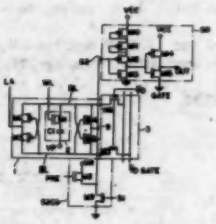
1. A sensing detection circuit for a memory comprising:

a first clock signal generator (CG1) responsive to an input signal for generating a clock signal;

a sensing clock signal generator (SCG) controlled by said first clock signal generator (CG1) for supplying a sensing signal (S1) to a memory array (1);

a sensing detector (SD) for detecting a first output signal (S2) from said memory array signifying the completion of the sensing of data from said memory array (1) and gener-

ating, in response to said first output signal, a second output signal (OUT) and;



a second clock signal generator (CG2) responsive to said second output signal from said sensing detector (SD) for generating a successive clock signal.

4,959,815

DIGITAL SIGNAL PROCESSOR

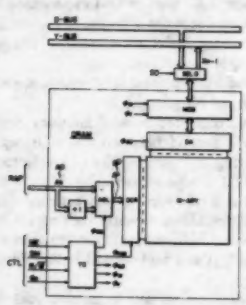
Hirohumi Wada, Tokyo, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Apr. 21, 1988, Ser. No. 184,242

Claims priority, application Japan, Apr. 24, 1987, 62-99778

Int. Cl.[5] G11C *8/00*

U.S. Cl. 365—230.06 **13 Claims**



1. A semiconductor integrated circuit device comprising:

data lines;

a plurality of memory cells each having input/output terminals and a selection terminal, wherein said input/output terminals are connected to said data lines, respectively;

a plurality of word lines connected to said selection terminals of said memory cells, respectively;

address signal generation means for generating a second address signal different from a first address signal upon receipt of said first address signal;

selection means for selecting a first word line in accordance with said first address signal upon receipt of said first address signal, and thereafter selecting a second word line in accordance with said second address signal; and,

amplification means for amplifying data transmitted from a first memory cell connected to the first word line selected in accordance with said first address signal to said data lines, said amplification means being connected to said data lines; wherein the memory data of said first memory cell selected in accordance with said first address signal is written into said second memory cell connected to said second word line selected in accordance with said second address signal.

4,959,816

SEMICONDUCTOR INTEGRATED CIRCUIT

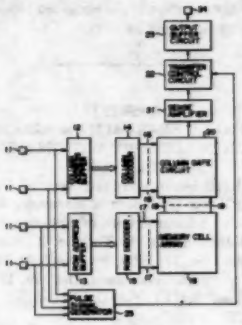
Hiroshi Iwahashi, Yokohama; Hideo Kato, Kawasaki, and Yuichi Tatsumi, Tokyo, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Dec. 27, 1988, Ser. No. 290,721

Claims priority, application Japan, Dec. 28, 1987, 62-330056; Oct. 7, 1988, 63-252971; Nov. 18, 1988, 63-291969

Int. Cl.[5] G11C *7/00*

U.S. Cl. 365—233.5 **31 Claims**



1. A semiconductor integrated circuit comprising:

data storage means;

pulse signal generating means for detecting a change in an address input and generating a first pulse signal;

data detecting means for detecting data stored in said data storage means corresponding to the address input;

data output means for externally outputting the data detected by said data detecting means; and

data output operation control means for controlling a level of the data output from said data output means so as not to be changed when a pulse width of the first pulse signal generated by said pulse signal generating means is smaller than a predetermined value, and for causing said data output means to set the level of the output data on the basis of the data detected by said data detecting means when the pulse width is larger than the predetermined value.

4,959,817

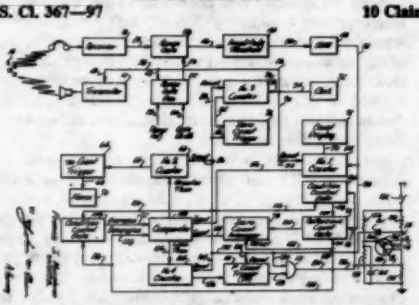
INTRUDER TARGET MONITORING SONAR ALARM SYSTEM

Francis J. Murphree, Maitland, Fla., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 26, 1969, Ser. No. 853,069

Int. Cl.[5] G01S *15/00*

U.S. Cl. 367—97 **10 Claims**



1. In a sonar system including a sound transmitter and re-

ceiver for monitoring an area where the number of normal targets therein may vary and for producing an alarm signal responsive to the presence of an intruder target in said area, the improvement comprising:

a. a timer connected to said transmitter and adjustable to provide a desired ping signal repetition rate;

b. a receiver range gate and range gate generator connected to said timer, transmitter and receiver to time sample the output of said receiver to produce gated output signals representative of an actual count of targets in said monitored area in the time period of said gate;

c. a first monitor circuit including a first counter connected to receive said gated output signals and a comparator connected to said counter;

d. said comparator being adjustable to provide in said comparator a reference count representative of normal target count to provide an error output signal when said actual target count received from said first counter exceeds said reference count in said time sample period;

e. a second monitor circuit including a second counter connected to receive said error output signals and an "m" count adjustable trigger programmed to pass an output alarm signal only when said error output signal count exceeds a predetermined "m" count allowable for normal target number variation to thereby avoid developing false alarm signals due to said normal target number variation.

4,959,818

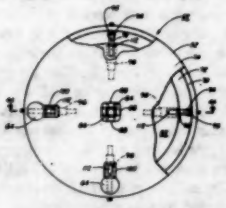
APPARATUS FOR GENERATING ELLIPTICALLY POLARIZED SHEAR WAVES

Jack H. Cole, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Division of Ser. No. 207,935, Jun. 13, 1988, Pat. No. 4,853,906, which is a continuation of Ser. No. 897,434, Aug. 18, 1986, abandoned. This application Jul. 20, 1989, Ser. No. 382,871

Int. Cl.[5] G01V *1/00*

U.S. Cl. 367—189 **13 Claims**



1. Apparatus for generation of elliptically polarized shear waves in an earth medium, comprising:

baseplate means including an earth engaging surface which is equally omni-directionally resistant to movement relative to said earth medium; and

force generation means affixed centrally to said baseplate means and consisting of a non-rotative, resiliently suspended reaction mass means and at least two hydraulic, linear drive means secured to said reaction mass and generating an effective radial force directed outward against the omni-directional resistance of said baseplate means and generally parallel to the earth engaging surface, which effective radial force is instantaneously linear but rotating at a preselected angular velocity relative to said earth engaging surface of said baseplate means.

4,959,819

REGENERATING POWER UNIT

Joseph J. Hacsewski, Jr., 1424 Poquoson Ave., Poquoson, Va. 23662

Filed Jul. 18, 1989, Ser. No. 381,273

Int. Cl.[5] G04F *1/04*; A63H *29/17*

U.S. Cl. 368—93 **14 Claims**

1. A regenerating power unit comprising:

a box housing having a pair of end members, a pair of side members and a front and back member,

said front and said back members being attached to and contained in spaced relationship with said pair of ends and said pair of sides,

at least one of said front and said back members being formed of a transparent material,

a rotatable axle member perpendicularly disposed relative to said front and said back members and having a length thereof extending through at least one of said front and said back members,

a wheel having a hub portion rotatable therewith,

said wheel being disposed between and adjacent said front and said back members,

said wheel including a plurality of vanes tangently extending from said hub portion to a distance spaced from said hub portion, each of said plurality of vanes having a surface that terminates at a point on said hub and merges at said point with a surface of an adjacent vane, a circular wheel cover on each side of said wheel abutting said plurality of vanes and forming a plurality of elongated, open end, triangular, chambers therewith,

at least one of said circular wheel covers on said wheel being formed of a transport material,

a pair of elongated diagonal supports in contacting relationship with said front and said back members,

said pair of elongated diagonal supports each having one end thereof fixedly connected to one of said side members and the other end thereof unattached and spaced from the opposite side member to thereby form a pair of open substantially triangular reservoirs on opposite sides of said wheel,

a quantity of a flowable medium disposed within one of said triangular reservoirs,

said flowable medium being selected from the group of flowable media consisting of a liquid, granular, finely divided sand particles, and equal sized microspheres,

aperture means formed in each said diagonal support to permit flow of said flowable medium therethrough,

said wheel being positioned relative to said aperture means such that any flow of said flowable medium therethrough will be received by at least one of said open end triangular chambers,

means for selectively closing and adjustably opening said aperture means and to control the rate of flow of said flowable medium therethrough,

whereby flow of said flowable medium passing through said

aperture means into said at least one of said angular triangular chambers of said wheel causes rotation of said wheel due to gravitational force of the flowable medium received therein and, as said wheel rotates, the chambers receiving said flowable medium are emptied while other chambers are rotated into position to receive the flowable medium passing through said aperture, with this wheel rotation continuing until the supply of said flowable medium is exhausted from said triangular reservoir, whereupon said box housing is rotated 180° to capture the expended flowable medium in the other of said triangular reservoir whereby the subsequent flow of said flowable medium through the aperture therein causes said wheel to resume rotation.

4,959,820

MAGNETOOPTICAL RECORDING APPARATUS WITH CONSTANT LEAKAGE MAGNETIC AND PULSE MODULATED MAGNETIC FIELD

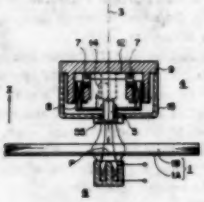
Hideyoshi Horimai, Chiba, and Yoshio Aoki, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 40,250, Apr. 26, 1987, abandoned. This application Nov. 14, 1989, Ser. No. 436,345

Claims priority, application Japan, Apr. 22, 1986, 61-93087

Int. Cl.[5] G11B *11/12, 13/04*

U.S. Cl. 369—13 **4 Claims**



1. A magnetooptical recording apparatus comprising; supporting and transporting means for supporting and transporting a magnetooptical recording medium having a perpendicular anisotropy magnetic thin film formed on a nonmagnetic substrate,

laser beam means, for operating a laser beam, provided on one side of said magnetooptical recording medium, including a magnet and a moving coil movable for controlling the focusing of said laser beam, mechanically connected to an objective lens through which said laser beam is irradiated on said magnetic thin film, said magnet generating and applying a D.C. magnetic field of one polarity perpendicular to a major surface of said magnetic thin film around a point where said laser beam is focused, and

pulse magnetic field generating means provided on the opposite side of said magnetooptical recording medium from said laser beam means, for applying a singlepolarity pulsed magnetic field, having opposite polarity to said one polarity, and perpendicular to said major surface of said magnetic thin film around said point, said pulsed magnetic field being modulated according to information signal to be recorded on said magnetooptical recording medium.

4,959,821

OPTICAL PICK-UP FOR SCANNING A MAGNETO-OPTICALLY RECORDED MEDIUM

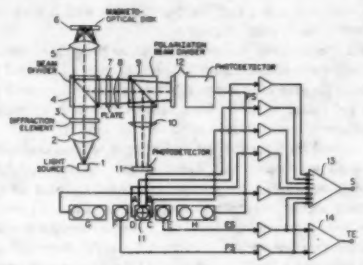
Yasuaki Morimoto, and Friedhelm Zucker, both of Villingen-Schwenningen, Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, VS-Villingen, Fed. Rep. of Germany

Filed Sep. 28, 1988, Ser. No. 250,728

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3732944

Int. Cl.[5] G11B *11/10*

U.S. Cl. 369—13 **6 Claims**



1. An optical pick-up for scanning a magneto-optically recorded medium comprising: a first photodetector, said recorded medium reflecting a first principal beam having a plane of polarization rotated in one direction onto said first photodetector; a second photodetector, said recorded medium reflecting a second principal beam having a plane of polarization rotated in another direction onto said second photodetector, said first and second photodetectors having output photovoltages; means for generating a data signal from the difference between said output photovoltages of said first and second photodetectors; a beam emitting source; diffraction means, a main beam from said emitting source being focused on said magneto-optically recorded medium through said diffraction means, said diffraction means splitting said mean beam into said principal beams and into subsidiary beams of at least orders +1 and −1; beams of orders higher than +1 and lower than −1 being also reflected onto said second photodetector by said recorded medium; means for generating auxiliary photovoltages from said beams of +1 and −1 orders; and means for subtracting at least said auxiliary photovoltages for generating said data signal, the output voltage of said second photodetector having noise components that are in phase and that are generated from said main beam, the output voltage of said second photodetector having also noise components of opposite phase that are generated from said subsidiary beams, the output signal of said first photodetector having only noise components generated by said main beam.

4,959,822

RECORD-CARRIER BODY PROVIDED WITH A RELIEF STRUCTURE OF OPTICALLY DETECTABLE SERVO-TRACK PORTIONS AND SECTOR ADDRESSES AND APPARATUS FOR FORMING SAID STRUCTURE

Johannes H. T. Pasman, and Nicolaas C. J. A. Van Hijningen, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 735,005, May 17, 1985, Pat. No. 4,893,298. This application Sep. 21, 1989, Ser. No. 410,691

Claims priority, application Netherlands, Jan. 22, 1985, 8500153

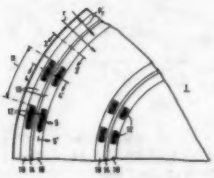
Int. Cl.[5] G11B *7/24, 7/26*

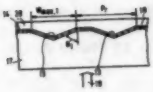
U.S. Cl. 369—44.11 **2 Claims**

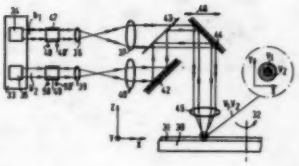
1. A record-carrier body on which information can be recorded and read by a radiation beam, comprising:

a substantially planar substrate having on a surface thereof a succession of longitudinally extending substantially parallel information tracks which are separated from each other in a direction transverse thereto, the transverse distance between the centers of adjacent tracks defining a track period;

each of said tracks having thereon successive sector addresses which alternate with successive servo portions along the length thereof, each sector address identifying the location of an adjoining servo portion, each sector address comprising optically detectable first areas which are spaced from each other in the longitudinal track direction by intermediate areas, said first areas having a first phase depth and said servo portions having a second phase depth differing from said first phase depth;







the servo portions of each track being adapted to produce, when such track is scanned by a radiation beam, radiation constituting a tracking error signal signifying deviations of said beam in a direction transverse to the longitudinal track direction; said servo portions having a recording layer thereon which is modifiable so as to enable recording of information by a radiation beam of write intensity; and

the servo portions of each track have a width in said transverse direction the maximum value of which is at least 60% of said track period and also is at least twice the maximum value of the width of said first areas in said transverse direction.

4,959,823

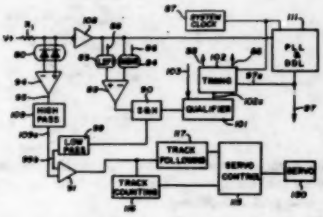
TRACKING AND SEEKING SYSTEM FOR USE WITH AN OPTICAL RECORD CARRIER HAVING A WOBBLED TRACK FORMAT

Kurt H. Getreuer, Colorado Springs, Colo., and Johannes J. Verboom, Bergeyk, Netherlands, assignors to Laser Magnetic Storage International Company, Colorado Springs, Colo.

Continuation of Ser. No. 147,906, Jan. 25, 1988, Pat. No. 4,879,708, which is a continuation of Ser. No. 760,440, Jul. 30, 1985, abandoned. This application Sep. 21, 1989, Ser. No. 410,357

Int. Cl.[5] G11B 7/09

U.S. Cl. 369—44.13 **9 Claims**



1. An optical disk system for use in providing a corrected tracking signal, comprising:

a record carrier having a track with a center line, a first wobbled pit offset to a first side of said center line and a second wobbled pit offset to a second side of said center line;

first means for generating a radiation beam and directing said radiation beam to said record carrier;

photodetector means for receiving a modulated radiation beam from said record carrier and outputting at least a first signal and a second signal indicative of said modulated radiation beam;

second means, responsive to said first signal and said second signal, for generating an uncorrected radial push-pull signal, said second means including differential amplifier means for outputting a difference signal that relates to a difference in amplitudes of said first and second signals;

third means, responsive to said first signal and said second signal, for generating a correction signal that relates to portions of said first signal and said second signal that correspond to said first wobbled pit and said second wobbled pit; and

fourth means for combining said uncorrected radial push-pull signal with said correction signal to produce a corrected radial push-pull signal.

4,959,824

OPTICAL INFORMATION RECORD/PICKUP HEAD ASSEMBLY

Toshihiko Ueda; Koultirou Tutiyasu; Kazuyuki Yoshida, and Mitsutoshi Yagoto, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Jul. 29, 1988, Ser. No. 226,435

Claims priority, application Japan, Jul. 31, 1987, 62-190379; Jul. 31, 1987, 62-190380; Jul. 31, 1987, 62-190381; Aug. 4, 1987, 62-195537

Int. Cl.[5] G11B 7/095

U.S. Cl. 369—44.14 **23 Claims**

3. An optical head for use in an optical disk system, comprising a stationary unit which is fixedly disposed in said system and a movable unit which is movable with respect to an optical disk loaded into said system, wherein said stationary unit emits a beam of light toward said movable unit which directs the received beam toward the optical disk while returning the

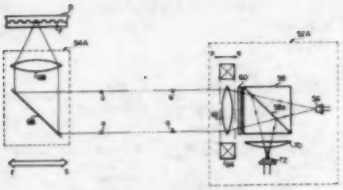
beam reflected from the optical disk to said stationary unit, said stationary unit comprising:

emitting means for emitting the beam;

collimating means for collimating the beam from said emitting means;

light sensitive means for receiving the beam reflected from the optical disk and for producing focus-state information;

guide means for directing the beam from said emitting means toward said movable unit and for directing the beam from said movable unit toward said light sensitive means, and



focusing means responsive to said focus-state information for moving said collimating means along the optical axis, said movable unit comprising:

carrier means being movable with respect to the optical disk so that the beam is directed to a desired location on the optical disk, and

only a single reflecting member fixedly mounted on said carrier means for directing the beam received from said stationary unit toward the optical disk and for returning the beam reflected from the optical disk toward the stationary unit.

4,959,825

RECORDED INFORMATION REPRODUCING APPARATUS WITH READING AND WRITING PHASE ADJUSTMENT

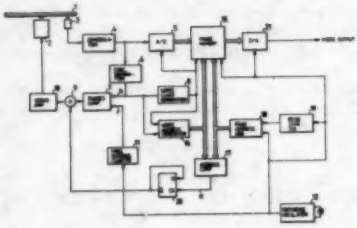
Takashi Okano, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 22, 1988, Ser. No. 209,812

Claims priority, application Japan, Jun. 29, 1987, 62-163201

Int. Cl.[5] H04N *5/95*; G11B *20/00*

U.S. Cl. 369—48 **7 Claims**



1. A reproducing apparatus for reproducing information recorded on a recording medium comprising:

means for reading information recorded on the recording medium;

separation means for separating a synchronizing signal contained within the read information;

means for generating a reference synchronizing signal;

means for comparing a phase of the synchronizing signal separated by said separation means with a phase of the reference synchronizing signal, and for generating an error signal which represents a phase difference therebetween;

memory means, coupled to said reading means, for storing and reading the information read from the recording medium;

means for generating a write clock signal in phase synchronous with said synchronizing signal;

means for generating a write address signal in response to said write clock signal;

means for generating a read address signal for said memory means in response to said generated reference synchronizing signal;

address comparing means for comparing the generated write and read addresses, said address comparing means being operable for generating a control signal when the absolute value of the difference between the generated write and read addresses is less than a predetermined value;

adding means for adding an offset signal to said error signal;

voltage varying means for varying a voltage of said offset signal in response to said control signal;

means for driving the recording medium according to an output of said adding means; and

means for reading the information written into said memory means.

4,959,826

SPREAD SPECTRUM OPTICAL COMMUNICATION SYSTEM WITH HETERODYNE DETECTION

David W. Smith, Woodbridge, England, assignor to British Telecommunications public limited company, United Kingdom

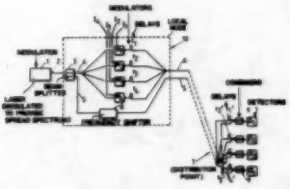
PCT No. PCT/GB87/00449, § 371 Date Feb. 29, 1988, § 102(e) Date Feb. 29, 1988, PCT Pub. No. WO88/00415, PCT Pub. Date Jan. 14, 1988

PCT Filed Jun. 26, 1987, Ser. No. 159,368

Claims priority, application United Kingdom, Jul. 1, 1986, 8616050

Int. Cl.[5] H04J *14/00*

U.S. Cl. 370—1 **21 Claims**



1. A method of transmitting information using a broad spectrum optical carrier signal source, said method comprising:

dividing the carrier signal over at least two paths,

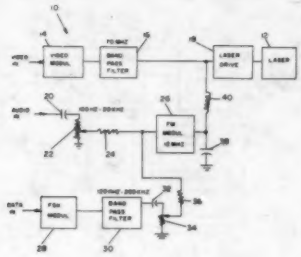
modulating the carrier signal in at least a first one of the paths in accordance with information and recombining the divided signals with delay multiplexing onto a common path, and

receiving the information by combining a portion of the recombined signal from said common path in heterodyne detection with a local oscillator signal having a frequency shifted with respect to the carrier, and in which the local oscillator signal is delayed prior to combination by a delay corresponding to a delay of the delay multiplexing.

4,959,827
LASER SIGNAL MIXER CIRCUIT

Timothy L. Grotzinger, Manheim, and Herbert A. Frederiksen, Mountville, both of Pa., assignors to Laser Communications, Inc., Lancaster, Pa.

Filed Mar. 30, 1989, Ser. No. 331,253
Int. Cl.[5] H04B 9/00
U.S. Cl. 370—3 4 Claims



1. A method of simultaneously transmitting and receiving video, audio and data signals with a laser beam link which comprises:

modulating an input video signal and passing it through a first bandpass filter after modulation;

frequency shift key modulating an input data signal and passing it through a second bandpass filter whose lowest pass frequency is at least three times the highest audio frequency;

combining an input audio frequency signal with the frequency shift key modulated and filtered data signal;

frequency modulating the combined audio frequency signal and data signal and passing it through a first low pass filter whose pass frequency is no more than one-third of the frequency of the modulated and filtered video signal;

combining the video signal with the combined audio frequency and data signals and feeding the combined three frequencies to a laser drive circuit which causes the combined frequencies to be transmitted on a laser beam;

receiving the laser beam on a photodetector which converts the light beam to an electrical output signal similar to the signal fed to the laser drive circuit;

feeding the photodetector output signal to a third bandpass filter of approximately the same characteristics as the first bandpass filter and to a second low pass filter with approximately the same characteristics as the first low pass filter;

demodulating the output of the third bandpass filter to yield a signal similar to the input video signal;

feeding the output of the second low pass filter to an FM demodulator to produce a demodulated signal combining the original input data signal and input audio frequency signal;

feeding the demodulated signal to a third low pass filter which yields only a signal similar to the input audio frequency signal;

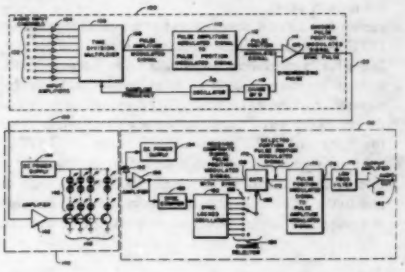
feeding the demodulated signal to a fourth bandpass filter with approximately the same characteristics as the second bandpass filter; and

frequency shift key demodulating the output of the fourth bandpass filter to yield a signal similar to the input data signal.

4,959,828
MULTI-CHANNEL INFRARED CABLELESS COMMUNICATION SYSTEM

Lawrence C. Austin, Orem, Utah, assignor to Corporation of the President of the Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah

Filed May 31, 1988, Ser. No. 201,581
Int. Cl.[5] H04J 14/08; H04B 10/24
U.S. Cl. 370—4 40 Claims



35. A system for receiving at least a first and a second audio signal comprising:

means for receiving a broadcast optical signal carrying a time multiplexed pulse position modulated signal, the carried pulse position modulated signal comprising a plurality of time slots, at least some of the time slots containing pulses, the positions of the pulses within each corresponding time slot indicating the amplitude of sampled portions of the first and second audio signals, the means for receiving an optical signal including means for translating the optical signal into a received pulse position modulated signal comprising a plurality of time slots containing pulses positioned therein so as to correspond to the pulse positions of the carried pulse position modulated signal;

means for selecting a time slot from the received pulse position modulated signal;

means for converting the pulse position information of said selected time slot so as to reproduce therefrom one of said first and second audio signals; and

means for presenting the audio signal to a user.

4,959,829
DUAL CABLE COMMUNICATION SYSTEM

John Griesing, Nashua, N.H., assignor to Wang Laboratories, Inc., Lowell, Mass.

Filed Mar. 30, 1989, Ser. No. 331,468
Int. Cl.[5] H04J 3/02
U.S. Cl. 370—85.3 3 Claims

1. A local area network (LAN) communication system comprising

a plurality of data terminal equipment (DTE) with each DTE including at least a transmit signal line, a receive signal line and a collision signal line for, respectively, transmitting data from the DTE in an CSMA/CD format, receiving data into the DTE in an CSMA/CD format and receiving a signal into the DTE in an CSMA/CD format indicating the detection of a data collision,

a data coaxial cable at least three meters long coupled to the DTEs for transmission between DTEs of electrical signals representative of serial digital data,

a reference coaxial cable of substantially the same length as the data cable coupled to the DTEs for electrically indicating to the DTEs when two or more DTEs are transmitting data onto the data cable at the same time,

the data and reference cables comprising dual coaxial cables

that are mechanically coupled to each other over a substantial portion of their length as if the two were a single cable and

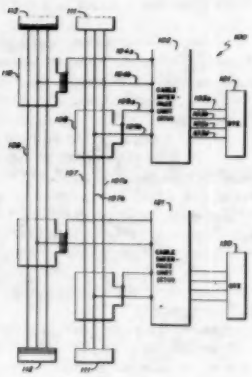
a plurality of cable interface units (CIUs) wherein a single CIU is coupled between a single DTE and the data and reference cables, each CIU including

at least first, second and third isolation circuits coupled to the receive, transmit and collision signal lines respectively of the DTEs for electrically isolating the CIUs and DTEs from each other,

a transmitter circuit coupled to the transmit signal line of a DTE through the first isolation circuit and to the data cable for transmitting serial data onto the data cable,

a receiver circuit coupled to the data cable and to the receive signal line of the DTE through the second isolation circuit for receiving serial data transmitted by a remote DTE and for transmitting the received data to the local DTE,

a collision signal circuit also coupled to the transmit signal line of the local DTE through the first isolation circuit and to the reference cable for applying a collision signal to the reference cable concurrently with the transmission of



data by the local DTE for indicating to remote DTEs that a DTE is transmitting data onto the data cable and

a collision detection circuit including

a comparator circuit coupled to the reference cable for testing a signal on the reference cable including the collison signal applied to the reference cable by the local DTE and like signals, if any, applied to the reference cable by one or more remote DTEs and for generating an output signal indicating when two or more DTEs are transmitting data onto the data cable at the same time and

a generator circuit coupled to the comparator circuit and to the collision signal line of the local DTE through the third isolation circuit for signaling the local DTE in response to the output signal indicating that two or more DTEs are transmitting data onto the data cable at the same time

wherein the local DTE, functioning in accordance with an CSMA/CD procedure, in response to the output signal stops transmission of data and restarts the transmission of the same data after a delay.

4,959,830

METHOD AND APPARATUS FOR THROUGH-CONNECTING A WIDEBAND CONNECTION IN A DIGITAL TIME SWITCH

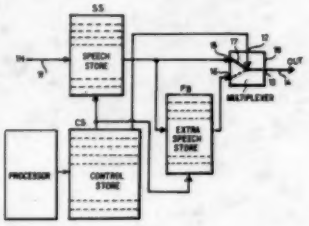
Lars-Göran Petersen, Tumba, Sweden, assignor to Telefonaktiebolaget L M. Ericsson, Stockholm, Sweden

Filed Jun. 14, 1989, Ser. No. 365,769

Claims priority, application Sweden, Jul. 12, 1988, 8802605

Int. Cl.[5] H04J *3/06*; H04L *7/00*

U.S. Cl. 370—108 **2 Claims**



1. Method of connecting a wideband connection comprising at least two channels through a digital time switch, incoming time slots arranged in successive frames being written in sequentially in said time switch, from which outgoing slots are read out sequentially, the content in incoming slots being switched to outgoing slots corresponding to said incoming slots, this switching being controlled from a control store, characterized in that the content in incoming slots is written frame by frame into a speech store and after the content in a first frame of slots is written in, the content in the slots in the subsequent frame is written into said speech store, whereby the content in the first frame is read out from the speech store and written into an extra speech store, the content of which is thus delayed one frame in relation to the content in the speech store, and that for each of the outgoing slots of the wideband connection, their ordinal numbers are compared in a processor with the ordinal number of a corresponding incoming slot, and for an outgoing slot which is an undelayed slot with an ordinal number which is greater than or equal to the ordinal of the corresponding incoming slot a first indication is made in said control store, and for an outgoing slot which is a delayed slot with an ordinal number which is less than the ordinal number of a corresponding incoming slot a second indication in said control store is made, and in that each outgoing time slot in the wideband connection has its indication in the control store read out, the content during an outgoing slot being read out from said extra speech store if the slot has said first indication, and from said speech store if the slot has said second indication, the contents in the outgoing undelayed slots of the wideband communication being delayed one frame in relation to the contents in the slots in an incoming frame, so that the contents in all outgoing slots of the wideband connection are delayed one frame, whereby the contents in the outgoing time slot are given the same order as the contents in corresponding incoming slots.

4,959,831

SINGLE WIRE BUS SMART KEYPAD CONTROLLER SYSTEM

Thomas R. Wroblewski, Sterling Heights, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Jul. 31, 1989, Ser. No. 386,840

Int. Cl.[5] H04J *3/02*

U.S. Cl. 370—112 **10 Claims**

1. A single wire bus multiplex system for a smart multiple switch scanner for use with a pulse-train signal comprising a succession of coded-pulse signals superimposed over an offset-voltage signal, said coded-pulse signals providing a series of

address codes for addressing a plurality of switches arranged as a matrix of switches at a remote location, said matrix comprising a plurality of row and column lines with each switch having a post connected to a row line and another post connected to a column, said system comprising:

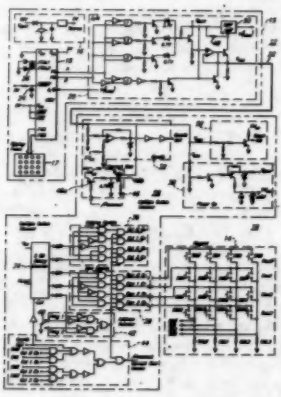
(a) means for generating the pulse-train signal;

(b) a bi-directional, single-wire bus adapted to transfer the pulse-train signal from a first end of said bus in a first direction to the remote location of the matrix and a series of current signals from a second end in a second direction, said bus being routed near the matrix;

(c) switch scanning means connected between said bus and the matrix, responsive to said pulse-train signal comprising:

(1) means for developing an internal power source from said offset-voltage signal;

(2) means for decoding said coded-pulse signals to obtain a series of address codes for addressing all but one switch of the matrix, said decoding means including an asynchronous counting means, said counting means having a capacity to count up to an exact count of one less than twice the total number of switches in the matrix;



(3) means for using said series of address codes to sequentially scan the column and row lines of the matrix so as to sequentially address each switch; and

(4) means for generating a first current signal on said bus in the second direction indicative that each switch with an address has been addressed and a second current signal indicative of each switch being pressed;

(5) for the switch without an address, means for generating a first current signal on said bus in the second direction indicative that the switch without an address is present and a second current signal of the switch without an address has been pressed;

(d) analog means at the first end of said bus for receiving the current signals on said bus and producing therefrom a series of analog voltage signal messages;

(e) means for converting said analog voltage signal messages into a first series of digital-coded messages;

(f) means responsive to the digital-coded messages for analyzing the messages and providing a second series of digital-coded messages that provide an interpretation of the analyses; and

(g) display means responsive to said second series of digital-coded messages for transforming said second series of digital-coded messages into a visible intelligible message.

4,959,832

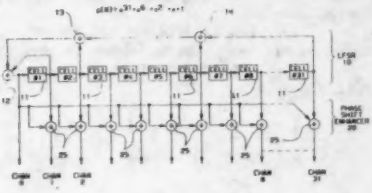
PARALLEL PSEUDORANDOM PATTERN GENERATOR WITH VARYING PHASE SHIFT

Paul H. Bardell, Jr., Carmel, N.Y., assignor to International Business Machines, Armonk, N.Y.

Filed Dec. 9, 1988, Ser. No. 281,617

Int. Cl.[5] G06F *11/00*

U.S. Cl. 371—27 **13 Claims**



1. A pseudorandom pattern generator comprising:

linear feedback shift register means having a plurality of cells for storing and sequentially shifting data patterns, each cell having input and output signal lines, said cells being connected in a feedback arrangement so that collectively said cells are cyclable through a pattern sequence determined by said feedback arrangement; and

phase shift enhancement means for increasing the phase shift between adjacent cell output lines.

4,959,833

DATA TRANSMISSION METHOD AND BUS EXTENDER

Gerald K. Mercola, Pleasanton, and Shih-Hsing Huang, San Jose, both of Calif., assignors to ICS Electronics Corporation, San Jose, Calif.

Filed Mar. 8, 1989, Ser. No. 321,528

Int. Cl.[5] G06F *11/08*

U.S. Cl. 371—32 **11 Claims**

1. A method of transmitting data and signals from a parallel bus comprising,

(a) receiving data and signals from a local parallel bus as they arrive at a local bus extender,

(b) continuously constructing serial messages of fixed size for transmission over a serial extender link, said messages including a tag number, mode bits representing the type of message, error checking bits and, whenever available, said data and signals, "blank"messages being constructed without data and signals whenever said data and signals are not available,

(c) continuously sending said constructed serial messages over a serial link to a remote bus extender,

(d) receiving said serial messages from said serial link at said remote bus extender, said received serial message being checked for an expected tag number and error checking bits corresponding to a valid errorfree message, said data and signals, whenever present, being buffered for transmission over a remote parallel bus, and

(e) loading said data and signals of said valid error-free messages onto said remote parallel bus,

wherein, a "request for retransmission" message frame identi-

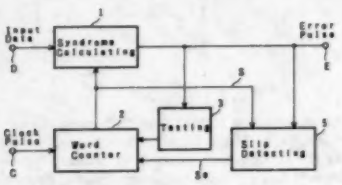
fying the last error-free message is sent over said serial link from said remote extender to said local extender only when an error in said received serial message, said expected tag number corresponding to said last error-free message.

4,959,834

WORD SYNCRONIZATION SYSTEM AND METHOD

Satoru Aikawa, and Yoichi Saito, both of Kanagawa, Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan

Filed Feb. 13, 1989, Ser. No. 309,587
Claims priority, application Japan, Feb. 13, 1988, 63-31137
Int. Cl.[5] G06F *11/10*
U.S. Cl. 371—47.1 **8 Claims**



1. A word synchronization system comprising:

circuit means, receiving encoded signals including error correction codes as an input, for calculating a syndrome indicative of a synchronization state, out of one initial phase;

controlling means, for:

(1) changing a current phase of said circuit means when the syndrome calculated by said circuit means is not a predetermined value indicative of synchronization,

(2) obtaining a new syndrome at a changed phase, and

(3) repeating the operations (1) and (2) until the syndrome becomes said predetermined value for a sequence of M times; and

synchronization slip detecting means, for determining a synchronization slip in the word synchronization when a particular syndrome is repeatedly detected for K_0 times out of a sequence of K times in the outputs from said circuit means, where $K_0 \leq K \leq M$.

4,959,835

SEMICONDUCTOR MEMORY

Nobuo Yosida, and Terahisa Shimizu, both of Ohme, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

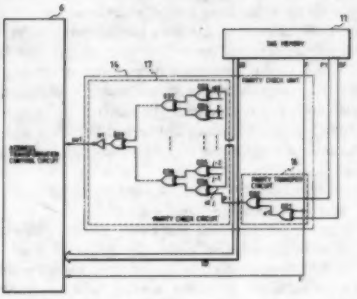
Filed Jan. 4, 1989, Ser. No. 293,444
Claims priority, application Japan, Jan. 12, 1988, 63-4417
Int. Cl.[5] G06F *11/00*
U.S. Cl. 371—51.1 **10 Claims**

1. A semiconductor memory comprising:

a memory array including a plurality of word lines, a plurality of complementary data lines and a plurality of memory cells respectively coupled to the corresponding word lines and the corresponding complementary data lines, wherein to each of said word lines are coupled first memory cells for holding a plurality of bits of data, a second memory cell for holding data representing whether or not said data is valid, a third memory cell for holding parity data concerning the first-mentioned data, and a fourth memory cell for holding data used to make a judgement as to whether or not the data held in said second memory cell has changed;

selecting means coupled to said a plurality of word lines, wherein said selecting means selects one word line according to an address signal supplied thereto;

check means supplied with data held in the memory cells which are coupled to one word line selected by said selecting means, wherein said check means judges whether or not the pieces of data respectively held in said second and fourth memory cells, which are supplied thereto, are coincident with each other and outputs the result of the judgement; and



output means supplied through said check means the data held in said first memory cells and the data held in said second memory cell, wherein said output means, when receiving a coincidence signal from said check means, outputs the data held in said first memory cells and the data held in said second memory cell.

4,959,836

REGISTER ROBUSTNESS IMPROVEMENT CIRCUIT AND METHOD

Paul M. Berard, and Ajaib S. Bhadare, both of Phoenix, Ariz., assignors to Siemens Transmission Systems, Inc., Phoenix, Ariz.

Filed Dec. 9, 1987, Ser. No. 130,850
Int. Cl.[5] G06F *11/08*
U.S. Cl. 371—69.1 **2 Claims**

1. A robust control circuit for coupling input data to system control points, comprising:

a digital data input for receiving an input of two data words of N bits each following in sequence, and a data output for outputting a valid data word to system control points only if the two compared data words are identical;

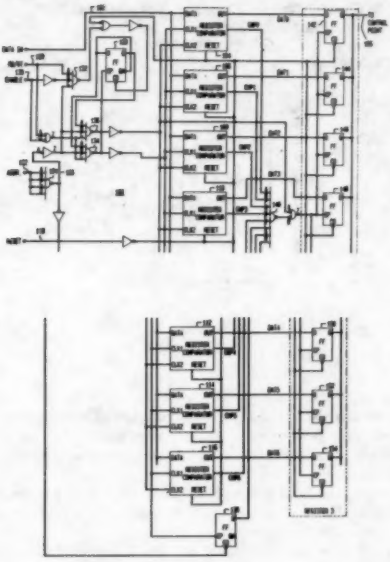
a plurality N of register/comparator circuits, each of which includes a first single-bit register element provided with a first single-bit data input, a first clock signal input, and a first single-bit data output, a second single-bit register element provided with a second single-bit data input, a second clock signal input, and a second single-bit data output, and a comparator element for comparing the first and second single-bit data outputs from said first and second register elements and providing a match signal output only if they are identical;

sequencer means, including an input for a READ, a first WRITE, and a second WRITE command sequence, a WRITE enabling circuit for providing clock signals for clocking N bits of a first data word from said digital data input into the N first single-bit register elements of said n register/comparator circuits upon receipt of the first WRITE command by said sequencer means and for clocking N bits of a second data word following said first data word into the N second single-bit register elements of said N register/comparator circuits upon receipt of the second WRITE command, and a pointer element for providing a pointer signal to said WRITE enabling circuit for alternately writing said first and second single-bit register elements upon receipt of said first WRITE and said second WRITE commands, said pointer element being reset upon receipt of said READ command;

a plurality of data transmission lines connecting the digital data input for said control circuit to each of the single-bit

data inputs of said first and second single-bit register elements of said N register/comparator circuits, and first and second sets of clock signal lines, each set being respectively connected between said WRITE enabling circuit and the clock signal inputs of respective ones of said first and second single-bit register elements of said N register/-comparator circuits;

a gate element for receiving the outputs of said comparator elements of said N register/comparator circuits and for providing an output of a valid data signal only if match signal outputs are received from all comparator elements; and



a third register circuit having input means connected to the single-bit data outputs of said second register elements of said N register/comparator circuits, an enable signal input connected to the output of said gate element, and output means forming said data output for said control circuit, said third register circuit being enabled to receive the N data output bits of said second register elements only if a valid data signal is provided to said enable signal input from said gate element,

whereby said third register circuit receives and outputs a valid data word of said N data output bits only if the two data words input to said first and second register elements, respectively, of said register/comparator circuits are identical.

4,959,837

DOPED OPTICAL FIBER LASER AMPLIFIER

Hervé Février, Massy; Josiane Ramos, Bondoufle; Jacques Auge, Saint-Cheron; Jean-Francois Marcerou, Caderousse; Bernard Jacquier, Marcoussis, and Jean-Claude Gàcon, Neuville S/Saone, all of France, assignors to Societe Anonyme dite: Compagnie Generale d'Electricite, Paris, France

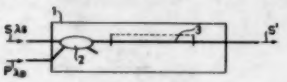
Filed Nov. 13, 1989, Ser. No. 434,192

Claims priority, application France, Nov. 10, 1988, 88 14711

Int. Cl.[5] H01S *3/30*

U.S. Cl. 372—6 **2 Claims**

1. An erbium-doped fiber laser amplifier, characterized by the fact that said fiber is doped to a concentration lying in the range 5 ppm to 50 ppm, that the length of said fiber lies in the range 250 m to 30 m depending on the selected concentration



of doping, and that the radial position of the doped zone substantially coincides with the energy maximum of the set of propagation modes in said fiber at the pumping wavelength.

4,959,838

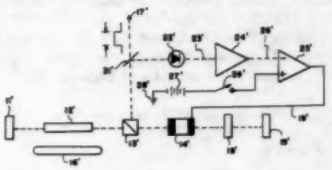
METHOD AND CIRCUIT FOR SHAPING LASER OUTPUT PULSES

Norman P. Barnes, Tabb, Va., assignor to The United States of America as represented by the Administrator of the National Aeronautics and Space Administration, Washington, D.C.

Filed May 31, 1989, Ser. No. 359,459

Int. Cl.[5] H01S *3/10*

U.S. Cl. 372—25 **12 Claims**



11. In a laser resonator including a laser medium and a voltage responsive Q-switch and a polarizer acting in combination to establish the loss level of said resonator in response to a first variable voltage of an initial value applied to said Q-switch to initiate laser action and produce a laser output pulse upon the pumping of said laser medium, the improvement comprising:

means for sensing the level of said laser output pulse upon its initiation and producing a second variable voltage responsive thereto; and

means for varying said first variable voltage from said initial determined value in response to said second variable voltage for a determined duration thereby controlling the length of said laser output pulse.

4,959,839

RIB WAVEGUIDE TYPE SEMICONDUCTOR LASER

Motoyuki Yamamoto, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Jul. 24, 1989, Ser. No. 383,530

Claims priority, application Japan, Jul. 25, 1988, 63-183495

Int. Cl.[5] H01S *3/19*

U.S. Cl. 372—46 **11 Claims**

1. In a rib waveguide type semiconductor laser, the improvement comprising:

a compound semiconductor substrate of a first conductivity type;

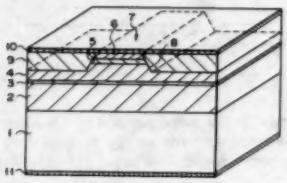
a lower cladding layer of the first conductivity type formed on said semiconductor substrate;

an active layer formed on said lower cladding layer;

an upper cladding layer of a second conductivity type formed on said active layer and having a mesa portion formed in a stripe configuration to extend in a direction parallel to the main surface of said semiconductor substrate;

an ohmic layer of the second conductivity type formed on said mesa portion of said upper cladding layer;

a current inhibition layer of the first conductivity type formed on portion of said upper cladding layer other than said mesa portion; and



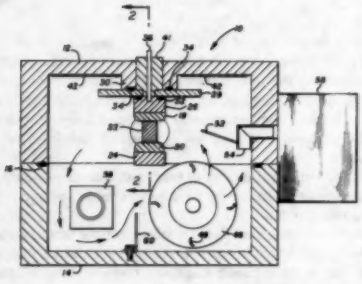
a high impurity concentration layer of the second conductivity type formed between said upper cladding layer and said ohmic layer and having an impurity concentration higher than the upper cladding layer and said ohmic layer.

4,959,840

COMPACT EXCIMER LASER INCLUDING AN ELECTRODE MOUNTED IN INSULATING RELATIONSHIP TO WALL OF THE LASER

Robert P. Akins; Donald G. Larson, both of San Diego; Uday K. Sengupta, Del Mar, and Richard L. Sandstrom, Encinitas, all of Calif., assignors to Cymer Laser Technologies, San Diego, Calif.

Filed Jan. 15, 1988, Ser. No. 144,799
Int. Cl.[5] H01S *3/22*
U.S. Cl. 372—57 **21 Claims**



1. In combination in a laser for use with a gas capable of a lasing action,

a housing structure having a plurality of walls forming an internal laser cavity,

a pair of spaced electrodes located within the laser cavity and forming an electrical discharge area between the electrodes for stimulating gas within the discharge area to lasing action in accordance with an electrical discharge between the electrodes,

a first one of the pair of electrodes located at a central position within the cavity and grounded to the housing structure,

an insulator member,

the other of the pair of electrodes located adjacent to, but spaced from, a first one of the walls of the housing structure and mounted on the insulator member, the insulator member being located intermediate to the first wall of the housing and the other electrode but spaced from the first wall and having first and second portions extending beyond the other electrode to have the extending portions of the insulator member floating relative to the housing structure, and

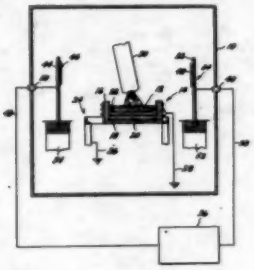
the insulator member being compressively supported at a central position of the insulator member and the first and second portions extending beyond the other electrode from this central position without any additional support to have the insulator member respond to any bending forces within the laser without any constraint other than the support at the central position.

4,959,841

PROCESS FOR REDUCING CONTAMINATION OF HIGH TEMPERATURE MELTS

Neil A. Johnson, Schenectady; Russell S. Miller, Ballston Spa, both of N.Y., and Gordon B. Hunter, Loveland, Ohio, assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 6, 1989, Ser. No. 376,095
Int. Cl.[5] H05B *7/00*
U.S. Cl. 373—10 **14 Claims**



1. The method of reducing contamination of melts melted by high intensity heat sources which comprises,

providing a enclosure in which such melting is to be accomplished,

providing an inert atmosphere or vacuum in said enclosure,

applying heat at high intensity to a metal in a heating zone within said enclosure,

providing at least one metal surface in said enclosure adjacent to the heating zone,

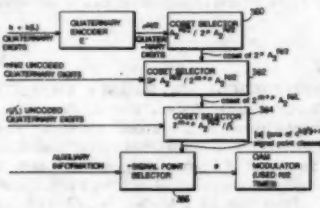
applying a charge of at least five kilovolts to said at least one metal surface to create an electric field in said zone to induce collection of a significant portion of the particulate and vaporous material emanating from said heating zone.

4,959,842

SIGNAL CONSTELLATIONS

G. David Forney, Jr., Cambridge, Mass., assignor to Codex Corporation, Canton, Mass.

Filed Apr. 13, 1988, Ser. No. 181,203
Int. Cl.[5] H04L *27/34*
U.S. Cl. 375—39 **31 Claims**



3. Apparatus for communicating data over a channel comprising

an encoder for selecting a series of signal points from a

constellation of available points, said costellation comprising points of a lattice Λ (or a coset Λ+c, where c is a translation vector) that lie within a Voronoi region of a sublattice Λ′ of Λ, Λ′ comprising a version of a binary lattice of depth at least two and normalized informativity less than one, and

a modulator for modulating a carrier on said channel in accordance with said selected series of signal points.

4,959,843

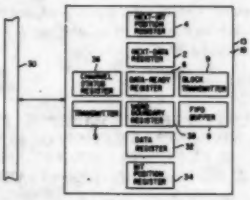
CONTENT INDUCED TRANSACTION OVERLAP (CITO) BLOCK TRANSMITTER

You K. Park, Vienna, Va., assignor to Allied-Signal Inc., Morris Township, Morris County, N.J.

Filed May 8, 1989, Ser. No. 348,435

Int. Cl.[5] H04L *27/04*

U.S. Cl. 375—59 **17 Claims**



1. A block transmitter of data comprising:

a plurality of register means for storing and positioning data for transmission;

FIFO buffer means for storing and providing a continuous supply of data from a data source to said plurality of register means;

block transmitter means for loading said plurality of register means from said FIFO buffer means; and,

means for transmitting said data from said plurality of register means onto a communication channel so that a full block of data is transmitted in a single data bucket using a block transmission method;

said plurality of register means comprises:

data register means for storing a multi-bit data work; each data bit of said multi-bit data word having one of two possible states;

word boundry register means for storing a number corresponding to the number of data bits in said multi-bit data word;

bit position register means for storing a number corresponding to the number of bits in said multi-bit data word;

channel status register means for functioning as a receiver portion of a plurality of senders and for storing a bit value of last transmission;

next-data register means for storing a next multi-bit data word after said next multi-bit data word is received from said FIFO buffer means, said next multi-bit data word is eventually loaded into said data register means after completion of transmission of said data register means;

next-bit position register means for storing a number corresponding to the number of bits in said next multi-bit data word, and,

data-ready register means for monitoring whether said data register means is ready to be loaded from said next-data register means.

4,959,844

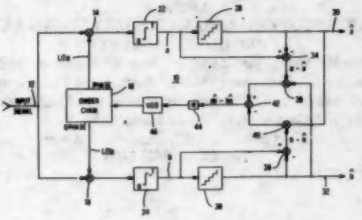
CLOCK RECOVERY CIRCUIT FOR DIGITAL DEMODULATOR

Patrick K. Walp, Penngrove, Calif., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Oct. 24, 1989, Ser. No. 426,367

Int. Cl.[5] H04L *27/06*

U.S. Cl. 375—97 **7 Claims**



1. In a digital demodulator of the type comprising means for multiplying an input signal with first and second orthogonal demodulation reference signals to generate respective product signals, means for integrating the product signals to generate first and second integrated values indicative of digital data encoded in the input signal, and means for digitizing the integrated values to generate first and second digital values, the improvement comprising:

first means for generating a first error signal indicative of the difference between the first integrated value and the first digital value;

second means for combining the first error signal with the second digital value to generate a first feedback signal;

third means for utilizing the first feedback signal to generate a control signal indicative of a phase difference between the input signal and the demodulation reference signals.

4,959,845

RECEIVER OF A SYSTEM FOR TRANSMITTING DATA SYMBOLS AT A GIVEN BAUD-RATE

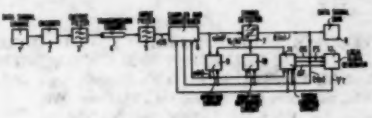
Simon J. M. Tol, Hilversum, and Kornelis J. Wouda, Nuenen, both of Netherlands, assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Feb. 9, 1989, Ser. No. 308,707

Claims priority, application Netherlands, Feb. 26, 1988, 8800490

Int. Cl.[5] H04L *7/027*

U.S. Cl. 375—106 **10 Claims**



1. A receiver of a system for transmitting data symbols at a given baud-rate 1/T, this receiver comprising a symbol detector operating at the baud-rate 1/T; means for optimally conditioning the received data symbols for symbol detection; means for deriving from a conditioned symbol an error signal which is representative of a phase difference between a baud-rate clock signal associated with the received data symbols and a locally generated baud-rate clock signal for the symbol detector; and phase control means for reducing this phase difference in a step-by-step fashion in response to the error signal, characterized in that the receiver comprises means for establishing whether the mean value of the error signal, over a predetermined number of symbol intervals, is situated in a zone whose

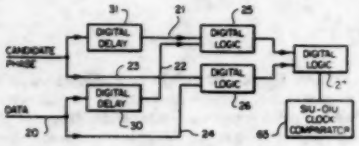
boundaries are determined by a first given fraction of the conditioned symbol value at the symbol detection instant, and means for blocking the phase control means if the mean value of the error signal is situated in said zone, and also for unblocking the phase control means if the mean value of the error signal in the blocked state meets a predetermined criterion.

4,959,846

CLOCK RECOVERY APPARATUS INCLUDING A CLOCK FREQUENCY ADJUSTER

William R. Apple, San Jose; William R. Freeman, Richmond; Paulmer M. Soderberg, Menlo Park; Lyle Thompson, Hayward, and Mark S. Thomas, Sunnyvale, all of Calif., assignors to Raynet Corporation, Menlo Park, Calif.

Filed Sep. 11, 1989, Ser. No. 405,806
Int. Cl.[5] H04L 7/00
U.S. Cl. 375—118 **15 Claims**



1. A digital phase acquisition device for acquiring clock for detecting data, comprising:

means for generating a clock signal of predetermined frequency;

means for generating N sample clock signals each having the predetermined frequency and being separated in phase from one another, N being an integer greater than 1;

digital means for finding an edge in a data signal and choosing any one of the N sample clock signals within two data bit time periods of an instant when a data edge is found for sampling the data to detect HIGH and LOW values therein;

the data signal including at least one packet having a clock recovery preamble of only 1 bit;

means for comparing the frequency of the data signal and the chosen sample clock signal and changing a data signal clock frequency so that the data signal clock frequency is closer to the predetermined frequency when a predetermined amount of drift therebetween is detected.

4,959,847

TELECOMMUNICATIONS DEVICE WITH AUTOMATIC CODE DETECTION AND SWITCHING

Robert M. Engelke, and Kevin R. Colwell, both of Madison, Wis., assignors to Ultratec, Inc., Madison, Wis.

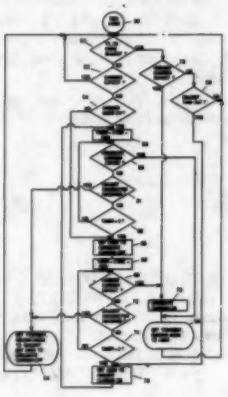
Filed Apr. 5, 1989, Ser. No. 334,003
Int. Cl.[5] H04L 17/00
U.S. Cl. 375—121 **14 Claims**

10. A method of operating a telecommunications device so that it will automatically select between Baudot and ASCII codes for communications with a remote telecommunications device with a preference for ASCII code, the method comprising the steps of:

(a) transmitting and receiving information in Baudot code;

(b) during intervals between transmission and reception of Baudot information, the telecommunications device automatically transmitting carrier tones appropriate to ASCII code communication and testing for a responsive tone;

(c) if no responsive ASCII tone is received, the telecommunications device continuing to communicate in Baudot code; and



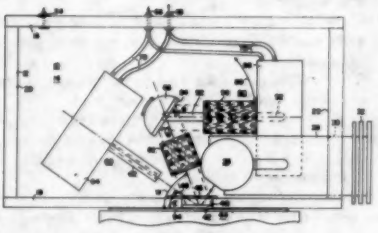
(d) if a responsive ASCII tone is received, the telecommunications device automatically switching its own mode of communication to ASCII code.

4,959,848

APPARATUS FOR THE MEASUREMENT OF THE THICKNESS AND CONCENTRATION OF ELEMENTS IN THIN FILMS BY MEANS OF X-RAY ANALYSIS

Lubomir Parobek, San Jose, Calif., assignor to AXIC Inc., Santa Clara, Calif.

Filed Dec. 16, 1987, Ser. No. 133,533
Int. Cl.[5] G01N 23/223
U.S. Cl. 378—46 **10 Claims**



1. An apparatus for the measurement of the thickness of a thin film disposed upon a substrate and the quantitative determination of certain elements within said thin film comprising:

a housing formed from at least one wall defining an enclosed space;

a window disposed within a wall of said housing and functioning to permit X-rays to pass therethrough;

an X-ray source within said housing and oriented therewithin to cause x-rays to be directed through said window;

a test sample holder disposed proximate said window and outside of said housing and functioning to hold a test sample outside of said housing in close proximity to said window such that said test sample will be irradiated by said X-rays;

a first X-ray detection system being fixedly engaged within said housing and operable to detect X-rays emitted from atoms within said test sample through said window, said first X-ray detection system providing a measurement

through the detection of a broad energy spectrum of X-rays from all emitting elements of said test sample;

a second X-ray detection system being movably engaged within said housing and operable to detect X-rays emitted from said atoms within said test sample and passing through said window, said second X-ray system being turnable to detect X-rays of a selected narrow wavelength band for measurement;

said measurement first said first X-ray detection system being utilized to determine the thickness of said thin film, and said measurement from said second X-ray detection system being utilized to provide a quantitative measurement of the content of particular elements within said thin film.

4,959,849

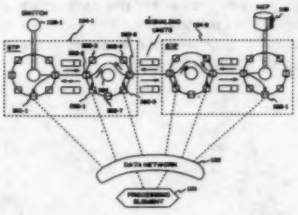
END-TO-END NETWORK SURVEILLANCE

Gurcharan S. Bhusri, Holmdel, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 31, 1989, Ser. No. 387,727

Int. Cl.[5] H04L *1/00*; H04M *3/32*

U.S. Cl. 379—32 **21 Claims**



1. A method of providing network surveillance for a call having associated signaling units, said method comprising the steps of:

setting to a predetermined state at least one bit within signaling units pertaining to said call, said call traversing a plurality of network elements; and

in response to said at least one bit with said predetermined state, transmitting to a processing element representation of signaling units exchanged between said network elements traversed by said call,

said call being monitored on a substantially end-to-end basis.

4,959,850

RADIO TELEPHONE APPARATUS

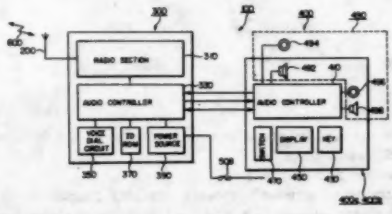
Kuniyoshi Marui, Tokorozawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed May 25, 1988, Ser. No. 198,551

Claims priority, application Japan, May 29, 1987, 62-134328; May 29, 1987, 62-134329

Int. Cl.[5] H04M *11/00*

U.S. Cl. 379—58 **25 Claims**



1. A radio telephone apparatus having a plurality of keys for inputting numerical data and command data thereto for communicating with a base station, comprising:

generating means for generating digital signals in response to utterances of at least one operator;

storing means for storing a plurality of address data;

recognizing means responsive to said generating means and said storing means for recognizing the digital signals and selecting an address data corresponding to the recognized digital signals;

mode setting means for setting a voice dial mode for a predetermined time period in response to the actuation of at least one of said plurality of keys;

channel establishing means responsive to said recognition means and said mode setting means for establishing a ratio channel with said base station if the address data corresponding to the recognized digital signals has been selected when the voice dial mode is set; and

broadcasting means responsive to said channel establishing means for broadcasting a call origination signal including at least the selected address data over the established radio channel.

4,959,851

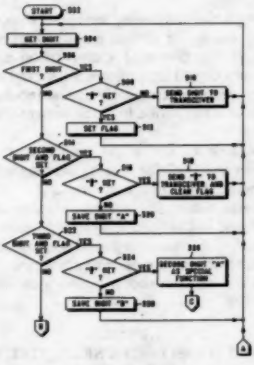
DIALING FEATURES FOR CELLULAR TELEPHONE WITH STANDARD TELEPHONE SET

Francis P. Tobolski, Jr., Algonquin, and Robert F. D'Avello, Hoffman Estates, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed May 10, 1989, Ser. No. 349,731

Int. Cl.[5] H04M *11/00*

U.S. Cl. 379—59 **8 Claims**



5. A method for selecting features of a cellular telephone including a telephone device having dialing means with at least ten numerical digits and at least one function digit, the cellular telephone including cellular transceiver means operable on cellular radio channels, and the cellular telephone including interface means coupling the standard telephone set to the cellular transceiver means and having memory means, each feature of the cellular telephone corresponding to a dialing sequence having two of the function digits separated by one of the numerical digits, said method comprising the steps of:

in said interface means:

receiving each entered digit;

setting a feature flag signal when the first one of the received digits corresponds to the function digit;

storing, when the feature flag signal is set, the second one of the received digits in the memory means; and

transmitting a coded message to said cellular transceiver means when the feature flag signal is set and the third one of the received digits corresponds to the function digit, the coded message being coded to identify the

feature corresponding to the dialing sequence represented by the first, second and third received digits; and

in said cellular transceiver means:

receiving the transmitted coded message from said interface means; and

selecting the feature of the cellular telephone corresponding to the received coded message.

4,959,852

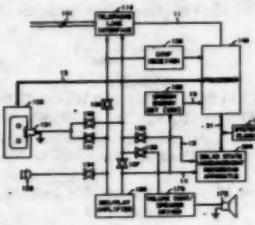
TELEPHONE ANSWERING MACHINE HAVING SOLID STATE AND MAGNETIC TAPE STORAGE FOR OUTGOING ANNOUNCEMENTS

Ronald J. Kerr; Alan D. Michel, both of Noblesville, and William V. Powell, Jr., Indianapolis, all of Ind., assignors to AT&T Information Systems Inc., Morristown, N.J.

Filed Oct. 19, 1987, Ser. No. 110,243

Int. Cl.[5] H04M *1/65*

U.S. Cl. 379—70 **16 Claims**



11. In a telephone answering machine including random access memory means for storing an announcement in binary digital form; and digital-to-analog conversion means for converting the binary digital announcement, stored in the random access memory means, into an analog announcement signal for transmission over a telephone line, the improvement comprising:

means responsive to the initial recording of said analog announcement signal for storing said signals exclusively on a magnetic tape storage means; and

analog-to-digital conversion means operative after the completion of said initial recording of said analog announcement signal, for converting said analog announcement stored on the magnetic tape, into a binary digital signal for storage in the random access memory means.

4,959,853

FREQUENCY RESPONSIVE SELECTIVE RINGING CIRCUIT

Philip J. Del Monte, 0701 County Rd. 143 A, Florence, Colo. 81226, and Jackie L. Vanwey, 24662 Webb Ct., Pueblo, Colo. 81006

Filed Feb. 2, 1989, Ser. No. 305,853

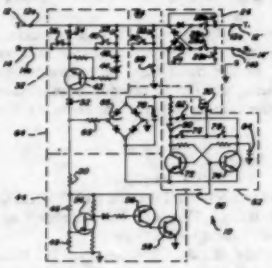
Int. Cl.[5] H04M *13/00*

U.S. Cl. 379—180 **19 Claims**

1. A frequency responsive selective ringing circuit for ringing telephone equipment connected to a telephone line upon receipt of a predetermined one of plurality of frequency-distinctive AC ringing signals which have potentials on the telephone line that alternate at predetermined different frequencies and for preventing ringing of the telephone equipment upon receipt of any other frequency-distinctive ringing signals, the telephone equipment ringing only in response to a ringing signal conducted therethrough, said selective ringing circuit comprising in combination:

rectifier and bypass means connected to the telephone line and operative for rectifying each of the ringing signals to a DC signal when not activated and for supplying the DC signal to the telephone equipment, and operative for electrically conducting the ringing signal to the telephone equipment when activated; and

detection and activation means connected to the telephone line and to the rectifier and bypass means, and operative in response to the potential of the AC ringing signals for



detecting a selected one of the frequency-distinctive AC ringing signals on the basis of one cycle of the AC ringing signal applied to the telephone line and for activating the rectifier and bypass means in response to the detection of the selected ringing signal.

4,959,854

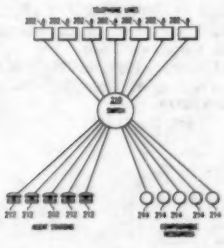
APPARATUS AND METHOD FOR AUTOMATICALLY RECONFIGURING TELEPHONE NETWORK RESOURCES

Ellis K. Cave, Garland; Dwain H. Hammond, Plano, and Michael J. Polcyn, Allen, all of Tex., assignors to InterVoice Inc., Dallas, Tex.

Filed Jan. 26, 1990, Ser. No. 471,284

Int. Cl.[5] H04M *1/64, 3/50*

U.S. Cl. 379—157 **52 Claims**



35. A system for reconfiguring resources in a telephone network, comprising:

a resource manager; and

a plurality of standard resource modules coupled to the telephone network, each of said resource modules configurable under control of said resource manager to perform a plurality of resource functions.

4,959,855

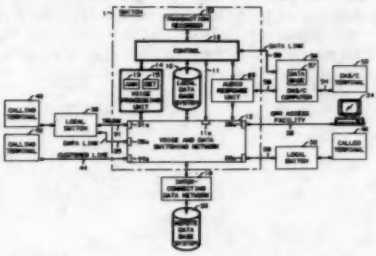
DIRECTORY ASSISTANCE CALL PROCESSING AND CALLING CUSTOMER REMOTE SIGNAL MONITORING ARRANGEMENTS

Abraham N. Daudelin, Colts Neck, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 916,615, Oct. 8, 1986, abandoned. This application Jul. 25, 1988, Ser. No. 225,607

Int. Cl.[5] H04M *3/50, 1/64*

U.S. Cl. 379—213 **15 Claims**



15. A method of setting up a telecommunications call connection in a telecommunications switching system comprising the steps of:

responsive to receiving, over a connection to a calling customer, an oral directory assistance request by an operator at an operator's position, entering data corresponding to the request into said operator position and transmitting the entered data to a directory number data base;

generating a directory number corresponding to the entered data;

CHARACTERISED IN THAT the method further comprises the steps of:

releasing the operator position from the connection;

testing whether establishment of a call from a caller on said link to a station identified by said directory number is permitted;

if said testing indicates that said call to said station is permitted, monitoring the connection for speech or non-supervisory multifrequency signals; and

if a selected signal is detected, automatically setting up a connection to a customer station identified by the directory number without any further calling action from the calling subscriber.

4,959,856

AUTOMATIC ADMINISTRATION OF A TELECOMMUNICATION SYSTEM

Raymond B. Bischoff, Westminster, and Norman C. Chan, Louisville, both of Colo., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

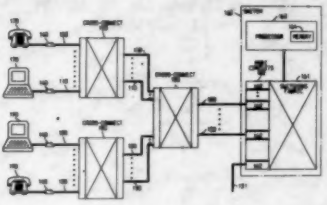
Filed May 4, 1989, Ser. No. 347,551

Int. Cl.[5] H04M *3/00*

U.S. Cl. 379—245 **43 Claims**

1. An apparatus comprising:

a plurality of communication ports each addressable by an extension number; and



means responsive to receipt of an extension number at an individual one of the ports for assigning the received extension number to serve as an address of the one port.

4,959,857

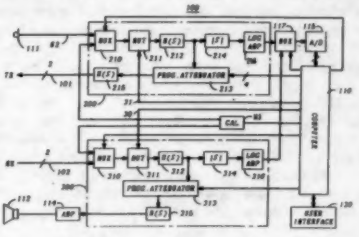
ACOUSTIC CALIBRATION ARRANGEMENT FOR A VOICE SWITCHED SPEAKERPHONE

Richard H. Erving, Red Bank, and Robert R. Miller, II, Convent Station, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Dec. 28, 1988, Ser. No. 298,526

Int. Cl.[5] H04M *9/08*

U.S. Cl. 379—390 **12 Claims**



1. In a voice switching apparatus for processing speech signals on a communication line, the apparatus including means for switching between a receive state for receiving speech signals from the communication line and a transmit state for transmitting speech signals over the communication line, an acoustic calibration circuit for determining the type of acoustic environment in which the voice switching apparatus is employed, the calibration circuit comprising:

means for generating a tone burst signal in said environment, the tone burst signal comprising multiple frequency signals generated separately at different time intervals and for a common fixed time period;

measuring means responsive to the return of the tone burst signal to said apparatus for measuring the resulting time-domain acoustic response of said environment; and

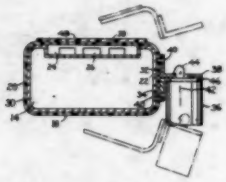
calibration means operably responsive to the measuring means for adjusting threshold switching levels at which the apparatus switches between the receive state and the transmit state.

4,959,858

SHIELD DEVICE FOR PUSHBUTTON TELEPHONE

Percy Silva, 208 Pacific St., Patterson, N.J. 07503

Filed Jul. 21, 1988, Ser. No. 222,179
Int. Cl.[5] H04M *1/66*
U.S. Cl. 379—445 **1 Claim**



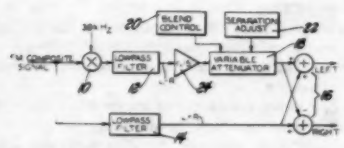
1. In association with a telephone handset which comprises an elongated three dimensional body having a receiver at one of its ends, a transmitter at its other end, and a hand grip section (14) therebetween; said hand grip section having a first inner face (16), a second outer face (18), and third and fourth side faces (20 and 22) interconnecting the inner and outer faces; and a bank of pushbuttons arranged on the inner face of the hand grip section: the improvement comprising a shield device installable on the hand grip section for temporarily preventing manual access to the pushbuttons; said shield device comprising a flexible plastic strap sized to tightly encircle and frictionally contact the hand grip section of the handset, said flexible strap having two free ends thereof oriented to meet at an intermediate point on the fourth side face of the handset hand grip section; a first rigid angle member (38) having a first leg thereof facially engaged with a face of said strap at one of its free ends; means (40) securing said first leg of said first angle member to said strap; said first rigid angle member having a second leg thereof projecting normal to the associated strap face; a second angle member (46) having a first leg thereof facially engaged with a face of said strap at its other free end; means securing said first leg of said second angle member to said strap; and second rigid angle member having a second leg thereof projecting normal to the associated strap face; said second leg of said first angle member constituting a keeper plate; a key lock (36) mounted on the second leg of said second angle member; said key lock including a latch bolt extendable through an opening in the keeper plate to retain the flexible strap in position on the hand grip section of the handset except when the key lock is operated to its unlocked condition; said plastic strap having a section thereof sized to overlie the bank of pushbuttons; and a rigid protector plate (48) secured to said strap section to reduce the flexibility of said strap section.

4,959,859

FM CHANNEL SEPARATION ADJUSTMENT

Gregory J. Manlove; Jeffrey J. Marrah, both of Kokomo, and Richard A. Kennedy, Russiaville, all of Ind., assignors to Delco Electronics Corporation, Kokomo, Ind.

Filed Dec. 15, 1988, Ser. No. 284,882
Int. Cl.[5] H04H *5/00*
U.S. Cl. 381—10 **4 Claims**



1. In an FM stereo circuit having a composite signal with base band left plus right channel content and another composite signal with base band left minus right channel content, and means for deriving from the composite signals separate right and left channel signals with each channel signal being substantially free of components of the other channel, means for adjusting the static separation of the channel signals comprising,

means for increasing the gain of one of the composite signals with respect to the other composite signal, and

blend control means including variable attenuator means for dynamically attenuating said one of said composite signals as a function of a signal strength,

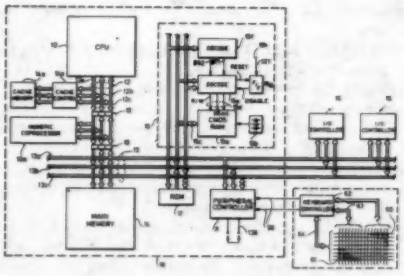
means for statically attenuating the said one composite signal by limiting the range of the blend control means to equalize the signal strengths of the two composite signals, whereby the derived left and right channels will be substantially free of signals from the other channel.

4,959,860

POWER-ON PASSWORD FUNCTIONS FOR COMPUTER SYSTEM

Jeffrey S. Watters; Norman P. Brown, and James H. Nuckols, all of Houston, Tex., assignors to Compaq Computer Corporation, Houston, Tex.

Filed Feb. 7, 1989, Ser. No. 307,402
Int. Cl.[5] H04L *9/00*
U.S. Cl. 380—4 **20 Claims**



1. A method of operating a computer system, comprising the steps of:

(a) storing a password and a pair of representations of said password in a non-volatile memory accessible by a CPU of said system;

(b) upon power-on initialization of said system, accessing said non-volatile memory to check said password against one of said pair of representations, and, if a match is not found, to check said password against the other of said pair;

(c) if a match is found in either of said checks, then writing the good one of the pair to the other or said pair, and comparing with said stored password a password entered by a user from a keyboard of said computer system, and if the passwords are the same, allowing normal operation of said system by said user to proceed, but, if the passwords do not agree, locking said user out of the system;

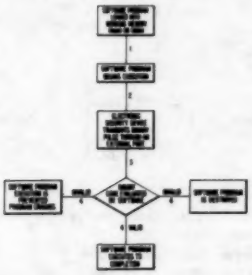
(d) if a match is not found in either one of said checks, then zeroing said stored password and said representations and allowing normal operation of the system to proceed without entry of a password by the user.

4,959,861

SECURITY SYSTEM FOR COMPUTER SOFTWARE

Edward L. Howlette, 1814 Metzerott Rd., Apt. 13, Adelphi, Md. 20783

Filed Jul. 13, 1988, Ser. No. 218,385
Int. Cl.[5] H04L *9/32*
U.S. Cl. 380—4 **13 Claims**



4. A method for securing software used in a computer having a memory, comprising the steps of:

(1) attaching a key for generating a predetermined coded signal to an input port of said computer said generation of said coded signal being independent of said software;

(2) loading a program into said memory, said program containing an algorithm for evaluating said signal generated by said key, and instructions for

(i) accessing the signal being evaluated and

(ii) allowing execution of said program according to predetermined security criteria;

(3) commencing execution of said program;

(4) transmitting said coded signal from said key to said memory;

(5) evaluating said coded signal according to the security criteria; and

(6) allowing said computer to complete the execution of said program only if said coded signal from said key satisfies the predetermined security criteria.

4,959,862

ACTIVE MULTICHANNEL VIDEO PROCESSING HUB FOR OPTIMUM TRANSITION FROM FIBER TO COAX

Mircho A. Davidov, Danville, and Kamaljit Singh, San Jose, both of Calif., assignors to Catel Telecommunications, Inc., Fremont, Calif.

Filed Apr. 28, 1988, Ser. No. 187,305
Int. Cl.[5] H04N *7/167*
U.S. Cl. 380—10 **13 Claims**

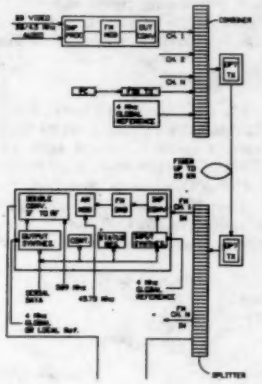
11. A multichannel cable television trunk system comprising:

means for frequency modulating a baseband audio signal to form intermediate frequency (IF) audio signals,

means for amplitude modulating a baseband video signal to form intermediate frequency (IF) video signals,

means for scrambling said IF video and IF audio signals to form scrambled IF video and IF audio signals and control information therein,

means for mixing said scrambled IF signals with local oscillator signals to form composite video and audio subcarrier signals, and



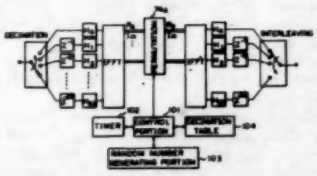
means for frequency modulating said composite subcarrier signals.

4,959,863

SECRET SPEECH EQUIPMENT

Mitsuhiro Azuma, Kawasaki; Fumio Amano, Tokyo; Ryota Akiyama, Tokyo, and Naoya Torii, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Jun. 2, 1988, Ser. No. 203,300
Claims priority, application Japan, Jun. 2, 1987, 62-138732; Feb. 4, 1988, 63-022895
Int. Cl.[5] H04K *1/04*
U.S. Cl. 380—38 **15 Claims**



11. Secret speech equipment for ensuring secrecy of an analog voice signal by band split frequency scrambling of digital samples obtained after digital signal processing of the analog voice signal, comprising:

decimation means for sequentially supplying every 2n samples of an input sampling signal having a period T in parallel outputs, each having a period nT;

2n first polyphase filters, each receiving one of the parallel outputs of said decimation means and passing one 1/(2n)-split frequency band of the analog voice signal, to produce outputs;

a first inverse fast Fourier transformer changing phase characteristics of the outputs of said polyphase filters to obtain complex signals, each being a 2n-multiplexed signal of a corresponding frequency band;

permutating means for permutating, in the frequency domain, frequency bands of the complex signals to produce outputs;

a second inverse fast Fourier transformer for applying an operation, reverse to that in said first fast Fourier transformer, to the outputs of said permutating means;

second polyphase filters, having substantially identical, char-

acteristics as said first polyphase filters, connected to said second inverse fast Fourier transformer, producing output signals corresponding to the frequency bands in the outputs of said permutating means; and

interleaving means for multiplexing and synthesizing the output signals of said second polyphase filters.

4,959,864

METHOD AND SYSTEM FOR PROVIDING ADAPTIVE INTERACTIVE COMMAND RESPONSE

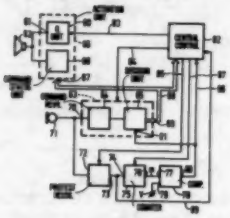
Floris L. Van Nes; Frederik F. Leopold, both of Eindhoven, and Frederik J. Schäffers, Hilversum, all of Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 825,836, Feb. 4, 1986, abandoned. This application Sep. 19, 1989, Ser. No. 409,996

Claims priority, application Netherlands, Feb. 7, 1985, 8500339

Int. Cl.[5] G10L 7/08

U.S. Cl. 381—43 **11 Claims**



7. A user interactive system for carrying out successive sections of a program in accordance with successive verbal commands given by the user in response to successive verbal questions presented to the user by the system, such system comprising:

an activation unit including a question unit for presenting verbal questions to the user and a command status unit for presenting to the user a verbal system reaction in response to each user command;

a command recognition unit for recognizing each user command;

a decision unit comprised in said command recognition unit for evaluating the reliability of recognition of each user command, and on the basis of such evaluation selecting one verbal reaction from a group of at least two possible verbal reactions of the system to such user command, the chosen system reaction being in accordance with a predetermined decision model;

a protest recognition unit for receiving a protest from the user each time the user perceives that the system reaction given in response to a user command is inconsistent with such command;

a counter coupled to the protest recognition unit for counting the number of user protests ('protest score') at least during each program section; and

a comparison circuit coupled to said counter for comparing the protest score of said counter with a predetermined level of at least two protests and supplying a control signal to said decision unit if said protest score exceeds said predetermined level;

said control signal causing said decision unit to initiate a time interval (T) during which interval said decision unit chooses another verbal reaction from said group of possible verbal reactions of said system in response to one or more user commands recognized by said command recognition unit during said time interval (T), said other verbal system reaction being presented to the user by said command status unit and including information describing such recognized commands.

4,959,865

A METHOD FOR INDICATING THE PRESENCE OF SPEECH IN AN AUDIO SIGNAL

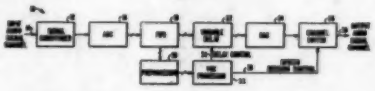
Yoram Stettiner, Ramat-Hasharon; Shabtai Adlersberg, Petah-Tikva, and Mendel Aitzner, Rishon-Le-Zion, all of Israel, assignors to The DSP Group, Inc., Emeryville, Calif.

Filed Feb. 3, 1988, Ser. No. 151,740

Claims priority, application Israel, Dec. 21, 1987, 84902

Int. Cl.[5] G10L 7/02

U.S. Cl. 381—46 **11 Claims**



8. An apparatus for indicating the presence of speech in an audio signal comprising:

a digital low-pass filter and clipping means coupled to filter time-invariant frames of an audio input signal;

means coupled to receive signals processed by said filter and clipping means for obtaining an autocorrelation function for each of a plurality of said frames of said audio signal;

means coupled to process said autocorrelation function for detecting peaks indicative of the presence of pitch of each of said frames of said audio in put signal, said processing means comprising:

a first peak decision processor for determining the amplitude of the highest ACF peak;

a second peak decision processor for determining the amplitude of the second highest ACF peak; and

a periodicity detector means for determining the periodicity of ACF peaks within each of said plurality of frames, whose amplitude exceeds a predetermined threshold, noting how many ACF peaks having the determined periodicity are detected; and providing a pitch/no pitch decision based on a weighted sum of non-linear functions of the amplitudes of the highest and second highest ACF peak and the number of detected ACF peaks having the determined periodicity;

means for analyzing said ACF of each of said plurality of frames to detect a tone in each of said plurality of frames and to obtain a tone/no tone decision for said frame;

an autocorrelation function periodicy detection means coupled to process said autocorrelation function for detecting the presence of pitch and tone in said audio input signal; and

decision combining means coupled to receive a pitch/no-pitch decision and a tone/no-tone decision for indicating the presence of voice speech upon coincidence of a no-tone decision and a pitch decision.

4,959,866

SPEECH SYNTHESIZER USING SHIFT REGISTER SEQUENCE GENERATOR

Noriko Matsuo, and Yukio Mitome, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Dec. 29, 1988, Ser. No. 291,827

Claims priority, application Japan, Dec. 29, 1987, 62-333373

Int. Cl.[5] G10L 9/18, 3/00

U.S. Cl. 381—51 **5 Claims**

1. A speech synthesizer comprising:

a memory, said memory storing at least one voiced sound source and at least one unvoiced sound source;

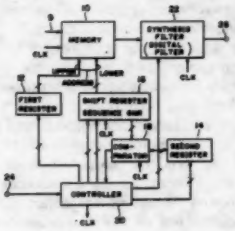
a first register, said first register being coupled to said memory and arranged so that the content of said first register forms a first portion of an address signal applied to said memory;

a shift register sequence generator, said shift register sequence generator being coupled to said memory and ar-

ranged so that the content of said shift register sequence generator forms a second portion of said address signal;

a second register, the register length of said second register being equal to the register length of said shift register sequence generator;

a comparator, said comparator being connected to said shift register sequence generator and said second register in such a way that the contents of said shift register sequence generator and said second register are caused to flow into said comparator, said comparator being arranged to output a coincidence signal in the event that the contents of said shift register sequence generator and said second register coincide; and



a controller, said controlling being connected to said shift register sequence generator, said first register, said second register and said comparator, said controller being responsive to said coincidence signal to reset at least said shift register sequence generator, said controller providing inputs to said shift register sequence generator, said first register, and said second register.

4,959,867

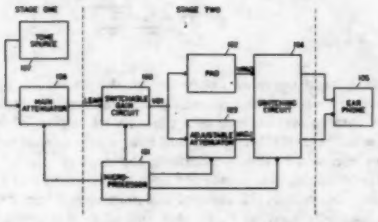
AUDIOMETER ATTENUATION METHOD AND APPARATUS

William J. Lutz, Middleton, Wis., assigaor to Nicolet Instrument Corporation, Madison, Wis.

Filed Aug. 11, 1988, Ser. No. 231,115

Int. Cl.[5] H03G *3/00*

U.S. Cl. 381—107 **18 Claims**



1. Attenuation apparatus for an audiometer of the type having an earphone with at least two input terminals with the sound output determined by the difference voltage between the input terminals, a tone signal source which provides a selected tone, and a main attenuator which attenuates the volume of the tone in steps to provide an output signal for transmission to the earphone, comprising;

(a) means for receiving the tone signal from the main attenuator and providing a selected low range signal to a first one of the input terminals of the earphone;

(b) adjustable attenuator means for receiving the signal from the main attenuator and providing an output signal to the other second input terminal of the earphone at a controllable level of attenuation, the means including a multiplying digital-to-analog converter having a digital word input, a digital input magnitude range, and an analog voltage reference input connected to receive the tone signal from the main attenuator, the analog voltage output of the multiplying digital to analog converter connected to provide its signal to the second terminal of the earphone, the output of the multiplying digital-to-analog converter being equal to the analog input signal times a fraction equal to the digital input word magnitude divided by the digital input magnitude range of the multiplying digital-to-analog converter.

4,959,868

IMAGE PROCESSING SYSTEM

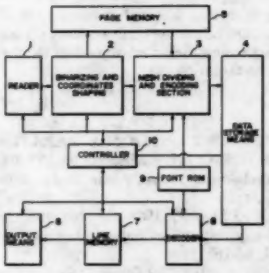
Hiroshi Tanioka, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 790,309, Oct. 22, 1985, abandoned. This application Jul. 5, 1988, Ser. No. 214,876

Claims priority, application Japan, Oct. 31, 1984, 59-229265; Oct. 31, 1984, 59-229266; Sep. 4, 1985, 60-196182

Int. Cl.[5] G06K *9/36*

U.S. Cl. 382—41 **19 Claims**



1. An image processing system comprising:

storage means for storing a binarized document image;

dividing means for dividing the document image stored in said storage means into rectangular areas in each of which a single character is included, detected by scanning all of the document image stored in said storage means;

discriminating means for discriminating a character image area and a non-character image area included in each of said rectangular areas; and

encoding means for compressing and encoding said image areas included in each of said rectangular areas on the basis of a first or second encoding method in accordance with the result of the discrimination of said discriminating means.

4,959,869

METHOD FOR DETERMINING BINARY CODING THRESHOLD VALUE

Yasuo Hongo, Kanagawa, Japan, assignor to Fuji Electric Co., Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 737,437, May 24, 1985, abandoned. This application Nov. 25, 1987, Ser. No. 125,813

Claims priority, application Japan, May 31, 1984, 59-109665

Int. Cl.[5] G06K *9/38*

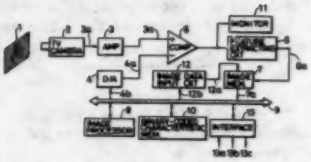
U.S. Cl. 382—51 **4 Claims**

1. A method for determining a set of binarization characteristic values representing area A_0, threshold t_0, and gradient γ_0 to be used for threshold control in processing video signals of a target object comprising the steps of:

generating a histogram for each of a plurality of reference objects representing an area of each of the objects in area percents for different values of a binary coding threshold value;

determining whether each of the plurality of reference objects is a bright object or a dark object in accordance with the histogram for that object;

determining a plurality of sets of reference binary coding threshold values, corresponding areas, and gradients, each of said sets corresponding to a different one of a plurality of reference objects, in accordance with the results of the bright/dark determining step;



storing said sets of reference binary coding threshold values in a memory device;

selecting from the memory device the stored set of reference binarization characteristic values for a reference object corresponding to the target object; and

generating from said selected reference set of binarization characteristic values the binary coding threshold value for use in processing the video signals of the target object to inspect the target object.

4,959,870

CHARACTER RECOGNITION APPARATUS HAVING MEANS FOR COMPRESSING FEATURE DATA

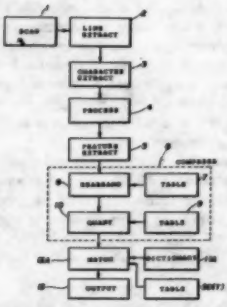
Michiyoshi Tachikawa, Tokyo, Japan, assignor to Ricoh Company, Ltd., Japan

Filed May 23, 1988, Ser. No. 197,225

Claims priority, application Japan, May 26, 1987, 62-129083; Jun. 29, 1987, 62-162111

Int. Cl.[5] G06K 9/56

U.S. Cl. 382—56 **11 Claims**



1. A character recognition apparatus comprising:

scanning means for scanning a document and for producing image data related to the document;

character extracting means for extracting from the output image data of said scanning means a character contained in a frame;

feature extracting means for extracting a feature of the character extracted in said character extracting means in a form of a feature vector, said feature vector having components which are histogram values of n degree peripheral pattern describing the feature of the character by distances from an arbitrary side of the frame to each of first through nth detected contour of the character within the frame;

compression means for compressing the feature vector from said feature extracting means into a compressed feature vector having components which are quantized data, said compression means comprising rearranging means for grouping the components of the feature vector into a predetermined number of groups for every predetermined number of degrees by uniformly distributing the components of the feature vector to each group depending on a sum of an average value and standard deviation of the components of the feature vector for each degree, and quantizer means for quantizing the components in each group with an independent quantization level for each group so as to obtain the quantized data having a predetermined number of bits for each group;

a dictionary which stores compressed feature vectors of standard characters; and

matching means for matching the compressed feature vector obtained from said compression means with each of the compressed feature vectors stored in said dictionary so as to output at least one candidate character corresponding to one of the standard characters described by a compressed feature vector having a minimum difference with the compressed feature vector obtained from said compression means out of the compressed feature vectors stored in said dictionary.

4,959,871

IMAGE INPUT/OUTPUT APPARATUS

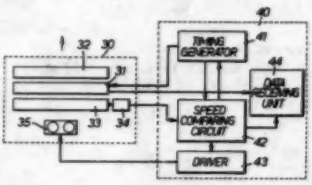
Akio Mori, Tokyo; Takeshi Aikawa, Chofu, both of Japan, and Mitsuo Saito, Arlington, Mass., assignors to Kabushiki Kaisha Toshiba, Tokyo, Japan

Continuation of Ser. No. 16,995, Feb. 19, 1987, abandoned, which is a continuation of Ser. No. 654,568, Sep. 26, 1984, abandoned. This application Sep. 13, 1988, Ser. No. 244,595

Claims priority, application Japan, Sep. 28, 1983, 58-178135

Int. Cl.[5] G06K 9/22

U.S. Cl. 382—59 **9 Claims**



1. In a hand operated image output device which can be manually moved across a recording surface in order to transfer image data to said surface in a plurality of sequential image lines, a method of transferring said image data to said recording surface, said method comprising the steps of:

(a) determining the number of lines which form said image data and storing the value of said number in a line counter;

(b) manually moving said image output device across said recording surface;

(c) generating a plurality of control pulses in accordance with the movement of said image output device;

(d) providing a reference clock signal and counting the number of clock pulses occurring between successive said control pulses;

(e) comparing said number of clock pulses with a predetermined maximum value and repeating step (d) while said number of clock pulses is greater than said predetermined maximum value;

(f) comparing said number of clock pulses with a predetermined minimum value and repeating at least one of steps (a)–(e) while said number of clock pulses is less than said predetermined minimum value;

(g) printing an image line of data on said recording surface;

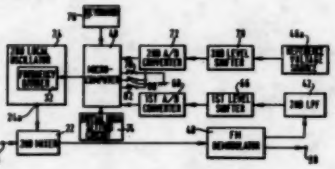
(h) decreasing the value stored in said line counter; and
(i) repeating steps (b)–(h) until the value stored in said line counter is zero.

4,959,872

AUTOMATIC FREQUENCY CONTROL APPARATUS FOR FM RECEIVERS

Tadashi Imai, and Shinobu Okitu, both of Saitama, Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Jun. 22, 1989, Ser. No. 370,001
Claims priority, application Japan, Jun. 23, 1988, 63-156404
Int. Cl.[5] H04B *11/16*
U.S. Cl. 455—164 **4 Claims**



1. An automatic frequency control apparatus for an FM receiver, comprising:
- oscillation means for generating a frequency controlled oscillation output in response to a received input FM signal;
- frequency conversion means for converting the input FM signal into an IF signal having a center frequency in response to the oscillation output from the oscillation means;
- demodulation means for demodulating the IF signal into a demodulated output having AC and DC components;
- low pass filter means for removing the AC component from the demodulated output;
- first A/D converter means for converting the remaining DC component of the demodulated output to a digital tuning signal;
- voltage generating means for outputting a reference voltage corresponding to the center frequency of the IF signal;
- second A/D converter means for converting the reference voltage from the voltage generating means to a digital reference voltage signal;
- calculating means for calculating the demodulation sensibility of the digital tuning signal from the digital tuning signal and the digital reference voltage signal and for generating an AFT data signal in response to the demodulation sensibility of the digital tuning signal for controlling the frequency of the oscillation means.

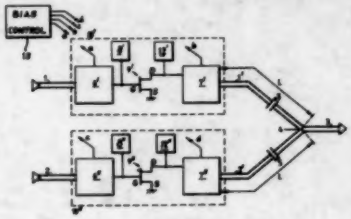
4,959,873

TRANSMISSION LINE SWITCH

Stephen J. Flynn, Watford, and Gerard King, Croxley Green, both of England, assignors to The Marconi Company Limited, England

Filed Jun. 27, 1989, Ser. No. 371,714
Claims priority, application United Kingdom, Jul. 8, 1988, 8816273; Jan. 20, 1989, 8901278
Int. Cl.[5] H04B *1/18*; H01P *1/15*
U.S. Cl. 455—303 **10 Claims**

10. A satellite TV receiving system comprising a receiving antenna, a transmission line switch and a receiver, said transmission line switch comprising:
- (a) two input lines for respective input signals, said input signals being two independent orthogonally polarized signals received by said receiving antenna,
- (b) an output line connected to said receiver,
- (c) a junction of said input lines and said output line, said input lines, said output line and said junction being formed as stripline on a microstripline board,
- (d) respective amplifying means connected in each of said input lines at a predetermined line length from said junction, each said amplifying means being operable in an 'on' state in which its input signal is transmitted with gain exceeding unity, and in an 'off' state in which said amplifying means has a predetermined output impedance, said predetermined output impedance and said predetermined line length together presenting a high impedance at said junction, and



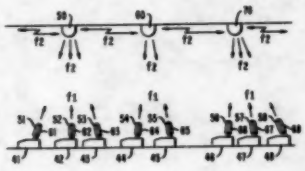
- (e) control means for controlling the two amplifying means to operate a selected one of said amplifying means in said 'on' state and the other amplifying means in said 'off' state, a selected one of said input signals being thereby switched to said output line for detection by said receiver.

4,959,874

OPTICAL WIRELESS COMMUNICATION SYSTEM

Makoto Saruta, Hiratsuka, and Tatsuhiro Suzuki, Yokohama, both of Japan, assignors to NCR Corporation, Dayton, Ohio

Filed Nov. 9, 1988, Ser. No. 269,823
Claims priority, application Japan, Dec. 28, 1987, 62-330401
Int. Cl.[5] H04B *10/14*; H04J *14/02*
U.S. Cl. 455—601 **11 Claims**



7. An optical repeater for use in an optical wireless communication system that includes a plurality of terminals having means for transmitting and for receiving optical signals, said optical repeater comprising a
- plurality of transmitters for communicating optically with said terminals through one optical wireless communication channel and for communicating optically with other optical repeaters through another optical wireless communication channel, a
- plurality of receivers for receiving optical signals from said terminals and from said other optical repeaters, and
- means for determining destination of optical signals wherein said optical repeater converts the frequency of received optical signals from one frequency to another frequency to transmit said converted signals from said transmitter of said optical repeater to said terminals and to other optical repeaters coupled thereto when said optical repeater receives said optical signals at said receiver therein from one terminal through said one optical wireless communication channel and said optical repeater transmits optical signals from said transmitter incorporated therein to said terminals and to all of the other optical repeaters coupled thereto except the transmitting optical repeater of said optical signals when each of the other optical repeaters receives said optical signals from another optical repeater coupled to said receiver through said another optical wireless communication channel.

DESIGN PATENTS

GRANTED SEP. 25, 1990

ERRATA

For CLASS	See PATENT NO.
D09-305	310,774
D08-382	310,780
D34-023	310,894
D34-026	310,895
D34-046	310,896
D32-060	310,897

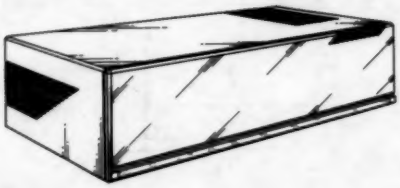
DESIGNS

SEPTEMBER 25, 1990

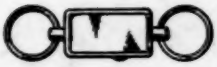
310,750
ZEBRA COOKIE
Patricia Constance, Wyckoff, N.J., assignor to Nabisco Brands, Inc., East Hanover, N.J.
Filed Jan. 14, 1985, Ser. No. 744,534
Term of patent 14 years
U.S. Cl. D1—128

310,751
COMBINED HAT AND PARTY BLOWOUT
Karola Finley, Rte. 4, Box 120, Gouverneur, N.Y. 13642
Filed Sep. 23, 1988, Ser. No. 248,472
Term of patent 14 years
U.S. Cl. D2—514

310,752
COMPACT DISC FILE
Jerry M. Long, Scotts Valley, and Peter J. Palmer, Cupertino, both of Calif., assignors to Creative Point, Inc., Fremont, Calif.
Filed Sep. 5, 1986, Ser. No. 904,236
The portion of the term of this patent subsequent to Sep. 11, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D3—35

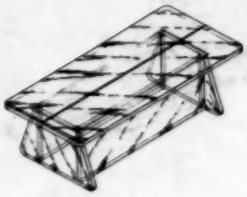


310,753
KEY HOLDER
James R. Stillwagon, 890 Gatehouse La., Worthington, Ohio 43235, and Scott H. Lee, R.R. #2, Church St., Putnam, Conn. 06260
Filed Jan. 11, 1989, Ser. No. 295,582
Term of patent 14 years
U.S. Cl. D3—61

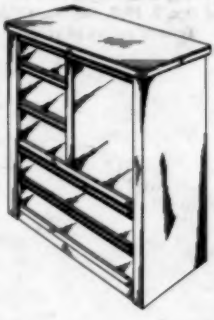


310,754
BRUSH BLOCK AND HANDLE UNIT
Eric Glagras, Cross Junction, Va., assignor to Rubbermaid Commercial Products Inc., Winchester, Va.
Filed Dec. 3, 1987, Ser. No. 127,970
Term of patent 14 years
U.S. Cl. D4—138

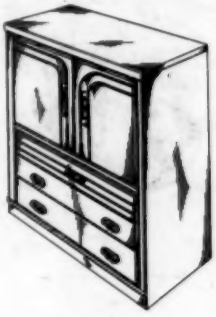
310,755
SUPPORT STAND FOR USE IN X-RAYING A HUMAN FOOT
Kevin A. Kirby, 3577 Imperial Way, Sacramento, Calif. 95826
Filed Jun. 8, 1987, Ser. No. 59,689
Term of patent 14 years
U.S. Cl. D6—349



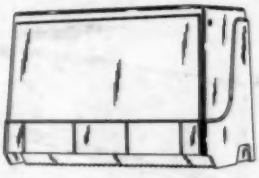
310,756
DOOR CHEST
Jericho P. Pauer, Onalaska; Jane Pronschinske, Cochrane, and Rick Lappin, La Crosse, all of Wis., assignors to Ashley Furniture Industries, Inc., Arcadia, Wis.
Filed Dec. 30, 1987, Ser. No. 139,375
Term of patent 14 years
U.S. Cl. D6—445



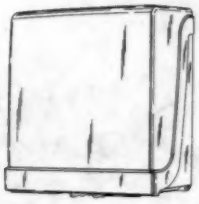
310,757
DOOR CHEST
Jericho P. Pauer, Onalaska; Jane Pronschinske, Arcadia, and Rick Lappin, La Crosse, all of Wis., assignors to Ashley Furniture Industries, Inc., Arcadia, Wis.
Filed Dec. 30, 1987, Ser. No. 139,425
Term of patent 14 years
U.S. Cl. D6—446



310,758
ROLLER DISPENSER
Carl-Arne Breger, Malmö, Sweden, assignor to Holmens Bruk Aktiebolag, Norrköping, Sweden
Filed Sep. 21, 1988, Ser. No. 247,329
Claims priority, application Sweden, Mar. 22, 1988, 880738
Term of patent 14 years
U.S. Cl. D6—518



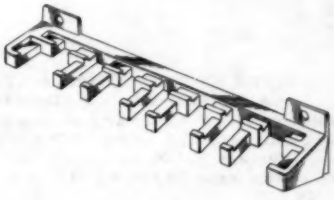
310,759
TOILET PAPER DISPENSER
Carl-Arne Breger, Malmö , Sweden, assignor to Holmens Bruk Aktiebolag, Norrköping, Sweden
Filed Sep. 21, 1988, Ser. No. 247,330
Claims priority, application Sweden, Mar. 22, 1988, 88-0739
Term of patent 14 years
U.S. Cl. D6—523



310,760
STORAGE CADDY FOR HOUSEHOLD BAGS
Kent W. Murphy, Wooster, Ohio, assignor to Rubbermaid Incorporated, Wooster, Ohio
Filed Sep. 16, 1988, Ser. No. 245,080
Term of patent 14 years
U.S. Cl. D6—515

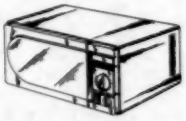
310,761
HANGING FILE
Bob Mervar, Columbus; Kent W. Murphy, Wooster, and Charles W. Craft, Jr., Apple Creek, all of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Jul. 21, 1988, Ser. No. 222,248
Term of patent 14 years
U.S. Cl. D6—567

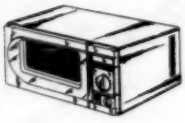
310,762
WRENCH RACK
Donald Embree, Copley, and David L. Hamann, Cincinnati, both of Ohio, assignors to Rubbermaid Incorporated, Wooster, Ohio
Filed Aug. 15, 1988, Ser. No. 232,508
Term of patent 14 years
U.S. Cl. D6—569



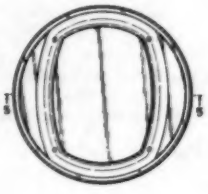
310,763
NON-SLIP SURFACE UNIT FOR BATHTUBS OR THE LIKE
Thomas W. Hillebrand, Janesville, Wis., assignor to Kohler Co., Kohler, Wis.
Filed May 23, 1986, Ser. No. 867,277
Term of patent 14 years
U.S. Cl. D6—583

310,764
MICROWAVE OVEN
Hideo Nishikawa, Osaka, Japan, assignor to Imanishi Kinzoku Kogyo Kabushiki Kaisha, Osaka, Japan
Filed Aug. 10, 1988, Ser. No. 230,856
Claims priority, application Japan, Feb. 10, 1988, 63-5223
Term of patent 14 years
U.S. Cl. D7—351

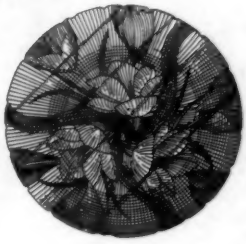




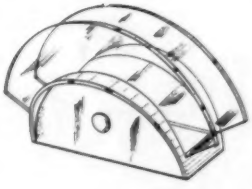
310,765
ELECTRIC HEATED WARMING PLATE
Franz A. Stützer, Offenbach am Main, and Bernd Figur, Seligenstadt, both of Fed. Rep. of Germany, assignors to Rowenta-Werke GmbH, Offenbach am Main, Fed. Rep. of Germany
Filed Jun. 20, 1988, Ser. No. 208,637
Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 5 MR 10808
Term of patent 14 years
U.S. Cl. D7—362



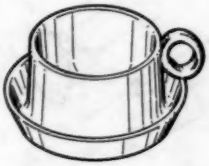
310,766
PLATE OR SIMILAR ARTICLE
Philippe J. Durand, Les Daneaux, Chemin de la Garenne, 62510 Arques, France
Filed Feb. 3, 1988, Ser. No. 151,789
The portion of the term of this patent subsequent to Oct. 2, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D7—564



310,767
HOLDER FOR NAPKINS
Furio Minuti, Macerata, Italy, assignor to Fratelli Guzzini S.p.A., Recanati, Italy
Filed Apr. 13, 1988, Ser. No. 181,493
Claims priority, application Italy, Dec. 1, 1987, 22814 B/87
Term of patent 14 years
U.S. Cl. D7—631



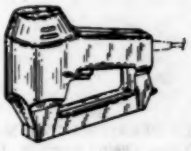
310,768
BOWL
Susan H. Levine, Richmond, Calif., assignor to Pottery by Levine, Inc., Richmond, Calif.
Filed Mar. 21, 1988, Ser. No. 171,528
Term of patent 14 years
U.S. Cl. D7—543



310,769
DOUBLE CLAMP TREE BRACE
Donald W. Jensen, Long Beach, Calif., assignor to Sullivan & Mann Lumber Co., Santa Ana, Calif.
Filed Nov. 23, 1988, Ser. No. 275,553
Term of patent 14 years
U.S. Cl. D8—1

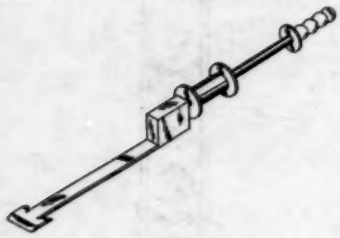
310,770
COMBINED SOCKET HOLDER AND SOCKET WRENCH
Santiago J. Zamarripa, 4401 Sheridan Rd., El Paso, Tex. 79906
Filed Jul. 6, 1988, Ser. No. 215,928
Term of patent 14 years
U.S. Cl. D8—29

310,771
ELECTRIC STAPLER
John F. Ewig, Worcester, Mass., assignor to Parker Manufacturing Company, Mass.
Filed Apr. 4, 1988, Ser. No. 176,985
Term of patent 14 years
U.S. Cl. D8—69



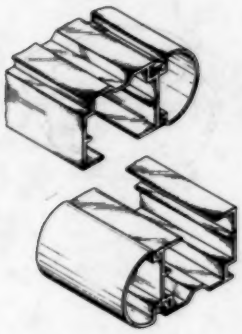
310,772
MULTI-VIAL LEVEL ATTACHMENT FOR HAND-HELD DRILLS
David E. Johnson, 2296 Scenic Dr., Lancaster, Ohio 43130
Filed Apr. 24, 1986, Ser. No. 857,619
Term of patent 14 years
U.S. Cl. D8—70

310,773
SLATE SHINGLE REMOVER
Steve A. Frady, 1000 W. College, Grapevine, Tex. 76051
Filed Sep. 28, 1988, Ser. No. 232,128
Term of patent 14 years
U.S. Cl. D8—89

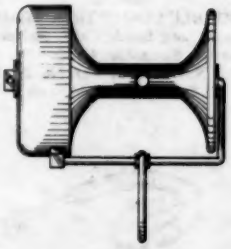


310,774
RECLOSABLE DEBRIS BAG WITH DEBRIS TRAP
Christopher G. Collins, 13946 Dawson St., Garden Grove, Calif. 92643, and Millie A. Carthew, Aukland, New Zealand, assignors to Christopher G. Collins, Garden Grove, Calif.
Filed May 1, 1987, Ser. No. 44,571
Term of patent 14 years
U.S. Cl. D9—305

310,775
CURTAIN TRACK UNIT
Matti Ruonala, Queensland, Australia, assignor to Uniline Australia Limited, Queensland, Australia
Filed Jan. 5, 1988, Ser. No. 141,037
Claims priority, application Australia, Sep. 3, 1987, 3209/87
Term of patent 14 years
U.S. Cl. D8—377



310,776
RETRACTABLE SKI ROPE REEL MATE
Larry Cason, 3317 Young Forest Dr., Augusta, Ga. 30906
Filed Mar. 7, 1988, Ser. No. 164,647
Term of patent 14 years
U.S. Cl. D8—358



310,777
LIQUID CONTAINER
Daniel S. Ross, Wylie; Alan M. Weintraub, Garland, and Joseph K. Ross, deceased, late of Wylie, all of Tex. (by Mary M. Ross Legal Representative), assignors to Ken Ross, Inc., Wylie, Tex.
Filed Sep. 6, 1988, Ser. No. 240,845
Term of patent 14 years
U.S. Cl. D9—378

310,778
BOTTLE OR SIMILAR ARTICLE
Nicholas Williamson, Burlington, Canada, assignor to Debus, Inc., South Bend, Ind.
Filed Mar. 3, 1987, Ser. No. 21,024
Term of patent 14 years
U.S. Cl. D9—367

310,779
COMBINED DEODORANT BOTTLE AND CAP
Rolf W. Gloeckler, Bonn, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany
Filed Apr. 7, 1987, Ser. No. 35,696
Claims priority, application Norway, Oct. 7, 1986, DM/007583
Term of patent 14 years
U.S. Cl. D9—377

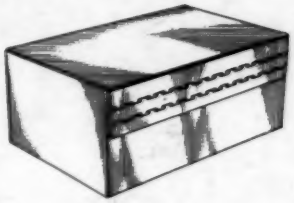
310,780
FENCE POST CLIP
Donald W. Kelley, 6205 Glenmoor, Garland, Tex. 75043, and Arthur L. Snell, 16650 Jones Maltsberger, San Antonio, Tex. 78247
Filed May 31, 1988, Ser. No. 200,195
Term of patent 14 years
U.S. Cl. D8—382

310,781
BOTTLE
Leon J. Scott, III, Marietta, Ga., assignor to Alpha Products, Inc., Atlanta, Ga.
Filed Jun. 14, 1989, Ser. No. 366,026
Term of patent 14 years
U.S. Cl. D9—398

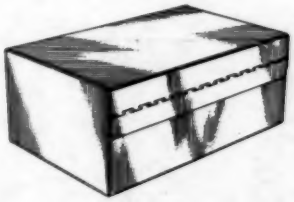
310,782
PERFUME BOTTLE
Jean-Jacques Durand, LaBate, 62510 Arques, France
Filed Feb. 12, 1988, Ser. No. 155,623
Term of patent 14 years
U.S. Cl. D9—404

310,783
BOTTLE
Everett C. Beeman, Wallingford, Conn., assignor to Innopak Plastics Corporation, Stonington, Conn.
Filed May 5, 1988, Ser. No. 190,415
Term of patent 14 years
U.S. Cl. D9—404

310,784
TEAR STRIP CARTON
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed May 7, 1987, Ser. No. 46,628
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—416

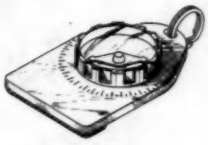


310,785
TEAR STRIP CARTON
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed May 7, 1987, Ser. No. 46,629
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—416

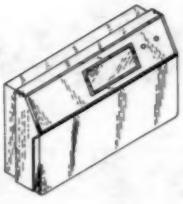


310,786
CONTAINER CLOSURE
Dieter F. Lay, Hawthorn Woods, Ill., assignor to Seaquist Closures, a division of Pittway Corporation, Crystal Lake, Ill.
Filed May 9, 1988, Ser. No. 191,596
Term of patent 14 years
U.S. Cl. D9—435

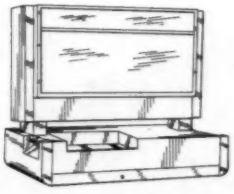
310,787
COMBINED COMPASS AND THERMOMETER
Marlin D. Iden, Riverton, Wyo., assignor to The Brunton Company, Riverton, Wyo.
Filed Feb. 13, 1987, Ser. No. 14,645
Term of patent 14 years
U.S. Cl. D10—53



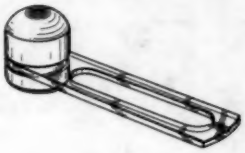
310,788
CLOCK THERMOSTAT
N. Thomas Wolfe, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.
Filed May 26, 1987, Ser. No. 54,167
Term of patent 14 years
U.S. Cl. D10—53



310,789
ENGINE ANALYZER
James R. Shaffer, Mount Prospect, and Lee F. Radtke, Lake Zurich, both of Ill., assignors to Sun Electric Corporation, Crystal Lake, Ill.
Filed Jan. 28, 1987, Ser. No. 8,609
Term of patent 14 years
U.S. Cl. D10—75



310,790
GAUGE INDICATOR
Vincent D. Reilly, 219 Engle St., Tenafly, N.J. 07670
Filed Oct. 5, 1987, Ser. No. 104,496
Term of patent 14 years
U.S. Cl. D10—103



310,791
KEYBOARD AND DISPLAY PANEL FOR AN INTRUSION DETECTION SYSTEM
Richard Farrell, West Babylon, and Richard Soloway, Lido Beach, both of N.Y., assignors to Napco Security Systems, Inc., Amityville, N.Y.
Filed Jul. 25, 1988, Ser. No. 223,759
Term of patent 14 years
U.S. Cl. D10—106

310,792
LIGHTED MARKER BUOY
Bradley E. Dalbec, 316 Iris La., St. Michael, Minn. 55376
Filed Apr. 5, 1988, Ser. No. 176,989
Term of patent 14 years
U.S. Cl. D10—107

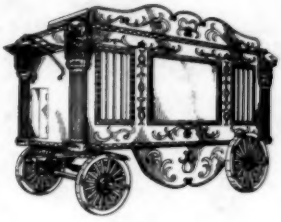
310,793
LIGHT BAR ASSEMBLY FOR VEHICLE ROOFS
John F. Castagna, Milford, Pa., assignor to Sparkomatic Corporation, Milford, Pa.
Filed May 2, 1988, Ser. No. 189,401
Term of patent 14 years
U.S. Cl. D10—114

310,794
SCARF SLIDE
Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France
Filed Apr. 28, 1988, Ser. No. 187,433
Term of patent 14 years
U.S. Cl. D11—202

310,795
SCARF SLIDE
Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France
Filed Apr. 28, 1988, Ser. No. 189,487
Term of patent 14 years
U.S. Cl. D11—2/2

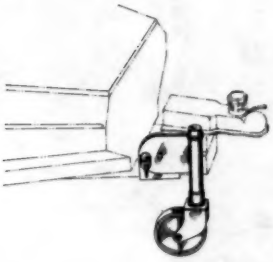
310,796
SCARF SLIDE
Josette Boivin, 50-52 rue de la Saussière, 92100 Boulogne S/Seine, France
Filed Apr. 28, 1988, Ser. No. 189,486
Term of patent 14 years
U.S. Cl. D11—203

310,797
CIRCUS WAGON
Thomas J. Smrt, 640 Industrial Dr., Cary, Ill. 60013
Filed Mar. 11, 1987, Ser. No. 24,403
Term of patent 14 years
U.S. Cl. D12—17



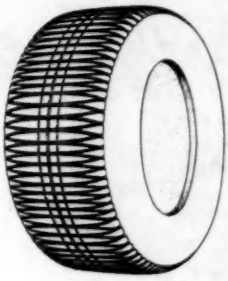
310,798
ROLLTRANSPORT CONTAINER
Esbrörn Stake, Hudiksvall, and Lennart Magnusson, Iggesund, both of Sweden, assignors to Mecania HB, Hudiksvall, Sweden
Filed Jul. 17, 1987, Ser. No. 74,912
Claims priority, application Sweden, Jan. 19, 1987, 87-0080
Term of patent 14 years
U.S. Cl. D12—97

310,799
TRAILER STAND
Jacobus C. van der Merwe, 801 Beechwood Dr., Kingsport, Tenn. 37663, and Lucas C. van der Merwe, 113 Dover La., Bristol, Tenn. 37620
Filed Jul. 19, 1988, Ser. No. 221,239
Term of patent 14 years
U.S. Cl. D12—106



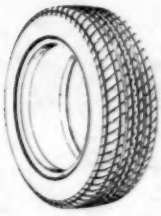
310,800
TIRE
Maurice Graas, Luxembourg, Luxembourg, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Mar. 7, 1988, Ser. No. 164,685
Term of patent 14 years
U.S. Cl. D12—137

310,801
TIRE
Paul B. Maxwell, Akron, and William E. Egan, Tallmadge, both of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Oct. 28, 1988, Ser. No. 264,310
Term of patent 14 years
U.S. Cl. D12—146

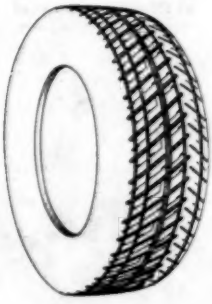


310,802
AUTOMOBILE TIRE
Yasuo Himuro, and Yuji Tateo, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Jul. 24, 1987, Ser. No. 77,539
Claims priority, application Japan, Jan. 26, 1987, 62-2312
The portion of the term of this patent subsequent to Jun. 21, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D12—147

310,803
AUTOMOBILE TIRE
Hirotsugu Hasegawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Nov. 20, 1987, Ser. No. 123,648
Claims priority, application Japan, May 20, 1987, 62-19757
Term of patent 14 years
U.S. Cl. D12—147

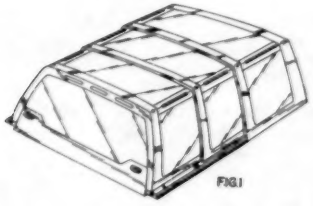


310,804
TIRE
Darrell E. Covert, Uniontown; Philip S. Hammond, Mogadore, and Paul B. Maxwell, Akron, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio
Filed Jul. 12, 1988, Ser. No. 218,594
Term of patent 14 years
U.S. Cl. D12—147

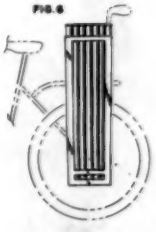


310,805
AUTOMOBILE TIRE
Toshio Hayakawa, and Hideaki Hashimoto, both of Tokyo, Japan, assignors to Bridgestone Corporation, Tokyo, Japan
Filed Aug. 20, 1987, Ser. No. 87,713
Claims priority, application Japan, Apr. 21, 1987, 62-15319
Term of patent 14 years
U.S. Cl. D12—151

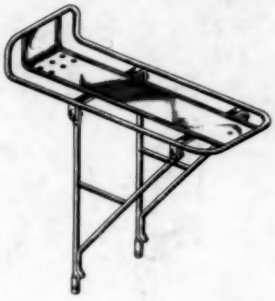
310,806
TELESCOPIC CAMPER CAP
William E. Hertzberg, Santa Barbara; Michael J. Botich, Ventura, and Mark Murphy, Thousand Oaks, all of Calif., assignors to Zipper Project, Inc., Santa Barbara, Calif.
Filed Oct. 24, 1988, Ser. No. 261,471
Term of patent 14 years
U.S. Cl. D12—156



310,807
BICYCLE MOUNTABLE GOLF CLUB RACK
Richard L. Lynch, 1047 Wellsville, Memphis, Tenn. 38117
Filed Apr. 18, 1988, Ser. No. 182,585
Term of patent 14 years
U.S. Cl. D12—158

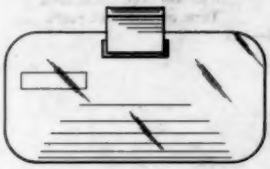


310,808
BICYCLE RACK
Irving W. Kosecoff, 2852 Sawtelle Blvd., No. 25, Los Angeles, Calif. 90064
Filed Nov. 2, 1988, Ser. No. 265,924
Term of patent 14 years
U.S. Cl. D12—158



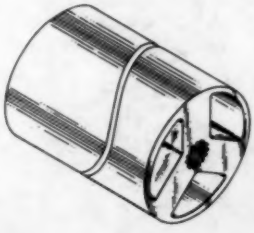
310,809
BICYCLE CARRIER RACK
Dennis P. Pawsat, and David K. McMurtrey, both of Maysville, Ky., assignors to Wald Manufacturing Co., Inc., Maysville, Ky.
Filed Dec. 1, 1988, Ser. No. 278,620
Term of patent 14 years
U.S. Cl. D12—158

310,810
PORTABLE VEHICLE SUN VISOR
Leslie B. Lewis, 79 Moorwood Dr., Suisun City, Calif. 94585
Filed Mar. 2, 1988, Ser. No. 162,860
Term of patent 14 years
U.S. Cl. D12—191

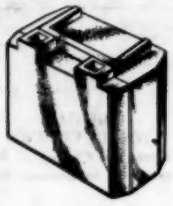


310,811
WHEEL COVER
David R. North, Warren, and Charles H. Stewart, Royal Oak, both of Mich., assignors to General Motors Corporation, Detroit, Mich.
Filed Aug. 1, 1988, Ser. No. 227,050
Term of patent 14 years
U.S. Cl. D12—206

310,812
PROPELLER HUB EXTRUSION
Robert M. Bergeron, Withers Grove, Derry, N.H. 03038
Filed Feb. 17, 1988, Ser. No. 156,655
Term of patent 14 years
U.S. Cl. D12—214



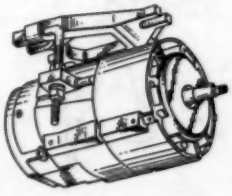
310,813
BATTERY FOR A PORTABLE RADIO
Richard Culbertson, and Henry A. Schaefer, both of Lynchburg, Va., assignors to Ericsson GE Mobile Communications Inc., Lynchburg, Va.
Continuation-in-part of Ser. No. 851,425, Apr. 11, 1986, Pat. No. D. 300,132. This application May 24, 1988, Ser. No. 202,653
The portion of the term of this patent subsequent to Mar. 7, 2003, has been disclaimed.
Term of patent 14 years
U.S. Cl. D13—103



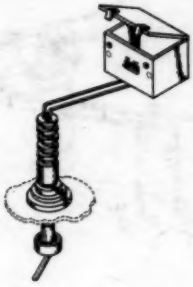
310,814
COMBINED SOUND ACTIVATED SWITCH AND COVER PLATE
Saul Rosenbaum, East Meadow, N.Y.; Douglas Watson, Stamford, Conn.; Joseph G. Justiniano, Bethpage, and Lester Rivera, Glendale, both of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Aug. 11, 1988, Ser. No. 230,927
Term of patent 14 years
U.S. Cl. D13—158

310,815
COMBINED SOUND ACTIVATED SWITCH AND COVER PLATE
Douglas Watson, Stamford, Conn.; Saul Rosenbaum, East Meadow, N.Y.; Joseph G. Justiniano, Bethpage, N.Y., and Lester Rivera, Glendale, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Aug. 11, 1988, Ser. No. 230,930
Term of patent 14 years
U.S. Cl. D13—158

310,816
ELECTRIC MOTOR WITH HINGED MOUNTING BRACKET
Tatsuya Sawato; Takashi Nakamura, and Hiroshi Kumatani, all of Nagoya, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Jun. 4, 1987, Ser. No. 57,977
Claims priority, application Japan, Jan. 26, 1987, 62-2610
Term of patent 14 years
U.S. Cl. D13—112



310,817
ENGINE HEATING UNIT
Larry Johnson, Box 70, and Leonard McCommon, 105 Pinehill Dr., both of Woodstock, Ga. 30188
Filed Apr. 25, 1988, Ser. No. 185,813
Term of patent 14 years
U.S. Cl. D13—119

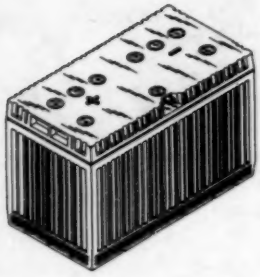


310,818
COMBINED DIMMER SWITCHES AND COVER PLATE
Albert Zaretsky, Brooklyn; Saul Rosenbaum, East Meadow; Lester Rivera, Glendale, and Benjamin Neiger, Floral Park, all of N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Aug. 11, 1988, Ser. No. 230,922
Term of patent 14 years
U.S. Cl. D13—125

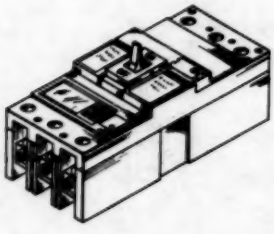
310,819
COMBINED DIMMER, FAN SPEED CONTROL SWITCHES AND COVER PLATE
Douglas Watson, Sanford, Conn.; Lester Rivera, Glendale, N.Y.; Joseph G. Justiniano, Bethpage, N.Y.; Saul Rosenbaum, East Meadow, N.Y.; Lawrence Mellyn, Pemaquid Harbor, Me., and Thomas A. Blumberg, New York, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Aug. 11, 1988, Ser. No. 230,925
Term of patent 14 years
U.S. Cl. D13—125

310,820
COMBINED DIMMER, FAN SPEED CONTROL SWITCHES AND COVER PLATE
Douglas Watson, Sanford, Conn.; Lester Rivera, Glendale; Joseph G. Justiniano, Bethpage; Saul Rosenbaum, East Meadow, all of N.Y.; Lawrence Mellyn, Pemaquid Harbor, Me., and Thomas A. Blumberg, New York, N.Y., assignors to Leviton Manufacturing Co., Inc., Little Neck, N.Y.
Filed Aug. 11, 1988, Ser. No. 230,926
Term of patent 14 years
U.S. Cl. D13—125

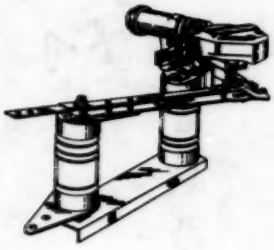
310,821
BATTERY CONTAINER
Randy K. Hulsebus, Colgate; Edward N. Mrotek, Grafton, and Douglas C. Brown, Glendale, all of Wis., assignors to Globe-Union Inc., Milwaukee, Wis.
Filed Nov. 14, 1988, Ser. No. 271,193
Term of patent 14 years
U.S. Cl. D13—104



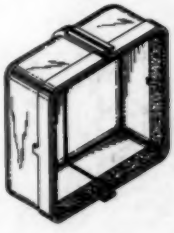
310,822
PROGRAMMABLE ELECTRONIC CIRCUIT BREAKER
Robert J. Danek, Andover, Conn., assignor to General Electric Company, New York, N.Y.
Filed Jun. 24, 1988, Ser. No. 211,189
Term of patent 14 years
U.S. Cl. D13—/160



310,823
INTERRUPTER SWITCH
Leonard V. Chabala, Maywood, and Edward J. Rogers, Chicago, both of Ill., assignors to S&C Electric Company, Chicago, Ill.
Filed Nov. 18, 1988, Ser. No. 273,437
Term of patent 14 years
U.S. Cl. D13—175



310,824
ELECTRICAL TRUNKING, UTILITY BOX
David E. Layton, North Wales, United Kingdom, assignor to EGA Limited, North Wales, United Kingdom
Filed Aug. 1, 1988, Ser. No. 226,988
Claims priority, application United Kingdom, May 9, 1988, 1050605
Term of patent 14 years
U.S. Cl. D13—152



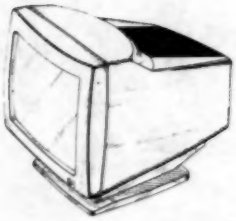
310,825
MODULAR PERSONAL COMPUTER SYSTEM OR SIMILAR ARTICLE
Pierre L. Crease, Centerville, Ohio, and Werner B. Stephan, Augsburg, Fed. Rep. of Germany, assignors to NCR Corporation, Dayton, Ohio
Filed May 13, 1987, Ser. No. 50,277
Term of patent 14 years
U.S. Cl. D14—100

310,826
CREDIT CARD INPUT/OUTPUT TERMINAL
Masami Suda, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Dec. 31, 1987, Ser. No. 141,311
Term of patent 14 years
U.S. Cl. D14—105

310,827
DATA DISPLAY WORK STATION
Donald Z. LaRochelle, Germantown; Brian G. Cooper, Mount Airy, and Vincent J. Melchiorre, Rockville, all of Md., assignors to Fairchild Space and Defense Corporation, Germantown, Md.
Filed Feb. 24, 1988, Ser. No. 159,644
Term of patent 14 years
U.S. Cl. D14—106

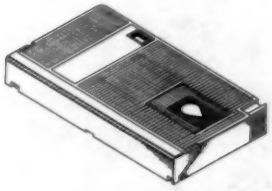
310,828
PERSONAL COMPUTER
Douglas R. Grundstrom, San Jose; Dennis J. Boyle, Menlo Park; Nelson S. Au, Foster City; Michael J. Nuttal, Palo Alto, and Matthew A. Herron, Menlo Park, all of Calif., assignors to Dynabook Technologies Corporation, Westlake Village, Calif.
Filed Dec. 22, 1988, Ser. No. 288,108
Term of patent 14 years
U.S. Cl. D14—106

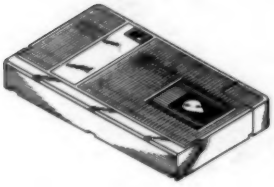
310,829
DISPLAY MONITOR
Tsutomu Suyama; Masaharu Wakamatsu, both of Hyogo; Koji Saito, and Kiyofumi Koya, both of Nagasaki, all of Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Aug. 17, 1987, Ser. No. 87,947
Claims priority, application Japan, Feb. 17, 1987, 62-5873
Term of patent 14 years
U.S. Cl. D14—113



310,830
ANTI-THEFT ANCHOR
Robert Perry, 5755 SW. Willow La., Lake Oswego, Oreg. 97034
Filed Sep. 25, 1987, Ser. No. 101,151
Term of patent 14 years
U.S. Cl. D14—114

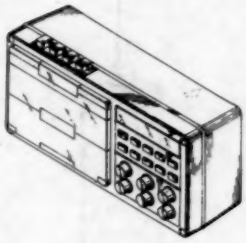
310,831
CLEANING CASSETTE FOR A MAGNETIC HEAD
Yeh T. Wan, No. 436, Nan Da Road, Hsinchu, Taiwan
Filed Nov. 29, 1988, Ser. No. 277,224
Claims priority, application Taiwan, Mar. 17, 1988, 77301392
Term of patent 14 years
U.S. Cl. D14—121

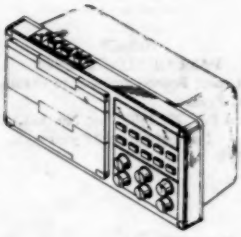




310,832
TELEVISION RECEIVER
Richard Gioscia, Garfield, N.J., and Ichiro Hino, Yokohama, Japan, assignors to Sony Corporation, Tokyo, Japan
Filed Oct. 14, 1988, Ser. No. 258,311
Claims priority, application Japan, Apr. 26, 1988, 63-16958
Term of patent 14 years
U.S. Cl. D14—131

310,833
MARINE RADIO
Douglas W. Low, Essex, Conn., and Elizabeth M. Pierotti, Grand View, N.Y., assignors to International Marine Industries, Inc., Stamford, Conn.
Filed Sep. 23, 1988, Ser. No. 249,081
Term of patent 14 years
U.S. Cl. D14—137



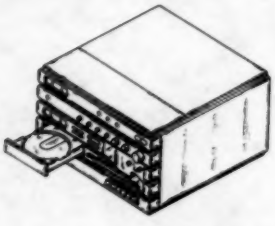


310,834
DIGITAL AUDIO DISC PLAYER
Hirokazu Shibata, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Aug. 30, 1988, Ser. No. 238,877
Claims priority, application Japan, Mar. 18, 1988, 63-11138
Term of patent 14 years
U.S. Cl. D14—156

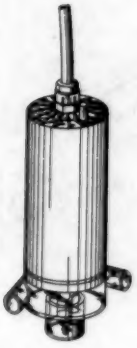
310,835
COMBINED RADIO AND CASSETTE RECORDER
Gary E. Grimes, Eersel, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.
Filed Jun. 9, 1988, Ser. No. 206,158
Claims priority, application United Kingdom, Dec. 22, 1987, 1047291
Term of patent 14 years
U.S. Cl. D14—163

310,836
TAPE PLAYER
Hideki Tsuboi, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan
Filed Mar. 10, 1988, Ser. No. 166,154
Claims priority, application Japan, Sep. 11, 1987, 62-36922
Term of patent 14 years
U.S. Cl. D14—165

310,837
COMBINED COMPACT DISC PLAYER, RADIO, RECEIVER AND TAPE RECORDER
Makoto Takimoto, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Sep. 20, 1988, Ser. No. 247,093
Claims priority, application Japan, Mar. 22, 1988, 63-11582
Term of patent 14 years
U.S. Cl. D14—168

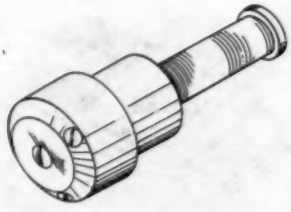


310,838
WALL-MOUNTED AQUARIUM PUMP
Heinz Turbanisch, Nuremberg, Fed. Rep. of Germany, assignor to Jet-Pumpen HT GmbH, Fed. Rep. of Germany
Filed Jun. 18, 1987, Ser. No. 63,903
Claims priority, application Fed. Rep. of Germany, Dec. 18, 1986, MR VII 324
Term of patent 14 years
U.S. Cl. D15—8

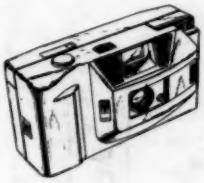


310,839
PAIR OF SUNGLASSES
Maurice Bollé, Codex, France, assignor to Etablissements Bollé S.N.C., Codex, France
Filed Feb. 29, 1988, Ser. No. 161,661
Term of patent 14 years
U.S. Cl. D16—102

310,840
DOOR VIEWER
Donald E. Degnan, 314 E. 77th St., New York, N.Y. 10021
Filed Sep. 2, 1988, Ser. No. 240,048
Term of patent 14 years
U.S. Cl. D16—134

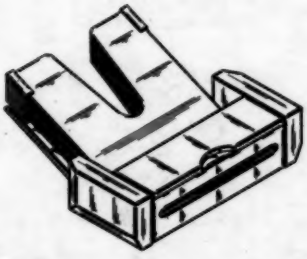


310,841
CAMERA
Ritsuko Inoue, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan
Filed Nov. 19, 1987, Ser. No. 122,425
Claims priority, application Japan, May 30, 1987, 62-022101
Term of patent 14 years
U.S. Cl. D16—209



310,842
GUITAR
Richard F. Vito, 931 N. Rose St., Burbank, Calif. 91505
Filed Dec. 14, 1987, Ser. No. 132,863
Term of patent 14 years
U.S. Cl. D17—14

310,843
SORTER FOR COPYING MACHINE
Mikio Kosako; Ritsuko Makihara, and Yoichi Tatsuta, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Apr. 20, 1987, Ser. No. 40,235
Claims priority, application Japan, Oct. 20, 1986, 61-41608
Term of patent 14 years
U.S. Cl. D18—42

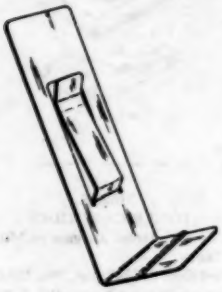


310,844
TONER CARTRIDGE
Yousuke Ohata, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan
Filed Dec. 8, 1987, Ser. No. 130,047
Claims priority, application Japan, Jul. 2, 1987, 62-26979
Term of patent 14 years
U.S. Cl. D18—43

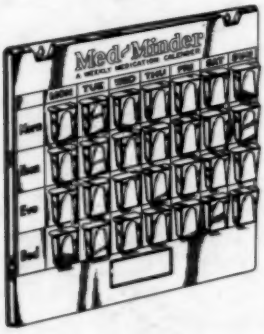
310,845
TONER CARTRIDGE
Yousuke Ohata, Osaka, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan
Filed Dec. 8, 1987, Ser. No. 130,048
Claims priority, application Japan, Jul. 2, 1987, 62-26978
Term of patent 14 years
U.S. Cl. D18—43

310,846
TAPE HOLDER
Hiroyuki Sakurai, Yokohama, Japan, assignor to Mitsubishi Pencil Co., Ltd., Tokyo, Japan
Filed Feb. 10, 1987, Ser. No. 12,937
Claims priority, application Japan, Sep. 27, 1986, 61-37948
Term of patent 14 years
U.S. Cl. D19—69

310,847
MESSAGE HOLDER
Robert E. Dietz, 99 Queen St East, Wellesley, Ontario, Canada N0B 2T0
Filed Feb. 25, 1987, Ser. No. 18,949
Term of patent 14 years
U.S. Cl. D19—90



310,848
COMBINED SET OF CONTAINERS AND WALL MOUNTED HANGING UNIT THEREFOR
Richard D. Perbix, 410 Comstock La., Plymouth, Minn. 55447
Filed Jan. 15, 1988, Ser. No. 144,083
Term of patent 14 years
U.S. Cl. D20—18

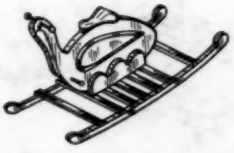


310,849
MEDICAL INFORMATION TAG
Jeffrey B. Davis, Lisle, Ill., assignor to CritiCard, Inc., Naperville, Ill.
Filed Feb. 9, 1988, Ser. No. 154,185
Term of patent 14 years
U.S. Cl. D20—22

310,850
SIMULATIVE DIE
Peter Hendrikx, Dusseldorf, Fed. Rep. of Germany, assignor to C.C. Creative Consulating S.A., Kronbuhl, Switzerland
Filed Feb. 4, 1988, Ser. No. 152,219
Claims priority, application United Kingdom, Aug. 13, 1987, 1044188
Term of patent 14 years
U.S. Cl. D21—41

310,851
SIMULATIVE DIE
Peter Hendrikx, Dusseldorf, Fed. Rep. of Germany, assignor to C.C. Creative Consulating S.A., Kreuzbuhl, Switzerland
Filed Feb. 4, 1988, Ser. No. 152,220
Claims priority, application United Kingdom, Aug. 13, 1987, 1044189
Term of patent 14 years
U.S. Cl. D2[illegible]-41

310,852
SIMULATIVE ROCKER
John G. Freiberger, Jr., 4722 Trade Winds Dr. South, and Kelly M. Allen, 2825 53rd St., South, both of Gulfport, Fla. 33707
Filed Sep. 7, 1988, Ser. No. 241,145
Term of patent 14 years
U.S. Cl. D21—69

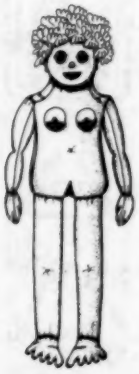


310,853
SIMULATIVE GLIDER
Dennis Kupperman, Glenview, Ill., assignor to RB Toy Development, Skokie, Ill.
Filed Oct. 24, 1988, Ser. No. 261,177
Term of patent 14 years
U.S. Cl. D21—89

310,854
TOY PUZZLE
Nancy D. Slayton, Cumberland, R.I.; John R. Nottingham, and John W. Spirk, Moreland Hills, both of Ohio, assignors to Dart Industries Inc., Deerfield, Ill.
Filed Aug. 4, 1988, Ser. No. 228,657
Term of patent 14 years
U.S. Cl. D21—105

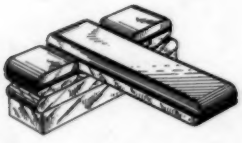
310,855
TOY CAMERA
Janet E. Snell-Kelly, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Sep. 29, 1987, Ser. No. 102,085
Term of patent 14 years
U.S. Cl. D21—110

310,856
ANATOMICAL DOLL FOR CHILD ABUSE INVESTIGATIONS
Carol M. Pedersen, 20075 SW. Imperial, Aloha, Oreg. 97006
Filed Mar. 16, 1987, Ser. No. 26,137
Term of patent 14 years
U.S. Cl. D21—166

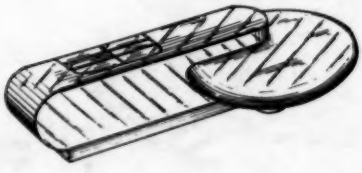


310,857
DOLL
Trevor A. Robinson, 1624 Nostrand Ave., Brooklyn, N.Y. 11226
Filed Jan. 8, 1987, Ser. No. 1,544
The portion of the term of this patent subsequent to Oct. 9, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D21—168

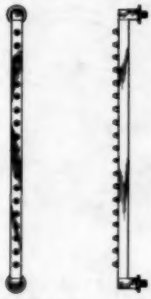
310,858
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,637
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



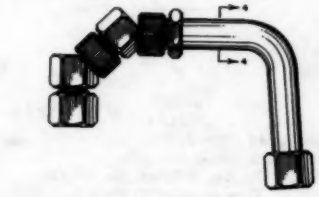
310,859
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,639
Term of patent 14 years
U.S. Cl. D23—241

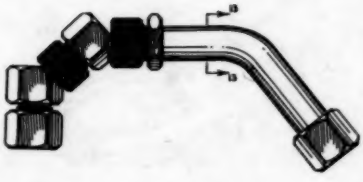


310,860
ELONGATED SHOWER HEAD WITH PLURAL SPRAY NOZZLES
Jean-Claude Delepine, 23, rue Clapeyron, 75008 Paris, France
Filed Jul. 12, 1988, Ser. No. 217,891
Claims priority, application Int'l Pat. Institute, Jan. 13, 1988, DM/010048
Term of patent 14 years
U.S. Cl. D23—213

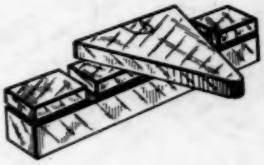


310,861
COMBINED CURVED WAND TIP WITH SWIVEL-MOUNTED NOZZLE
Robert W. Hengesbach, 7886 Munson Rd., Mentor, Ohio 44060
Division of Ser. No. 224,251, Jul. 26, 1988, which is a continuation of Ser. No. 15,604, Feb. 17, 1987, abandoned, which is a continuation-in-part of Ser. No. 674,272, Nov. 23, 1984, Pat. No. Des. 293,127, and a continuation-in-part of Ser. No. 461,874, Jan. 28, 1983, Pat. No. Des. 282,392. This application Feb. 21, 1989, Ser. No. 312,238
Term of patent 14 years
U.S. Cl. D23—213

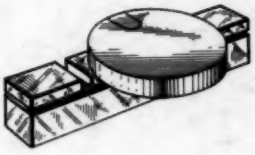




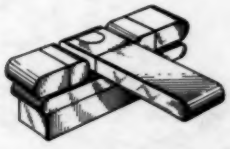
310,862
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,645
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



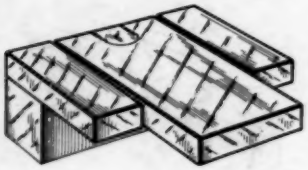
310,863
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,647
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



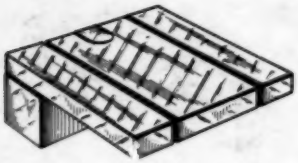
310,864
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed Apr. 16, 1987, Ser. No. 39,650
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D23—241



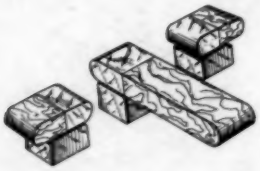
310,865
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,013
Term of patent 14 years
U.S. Cl. D23—241



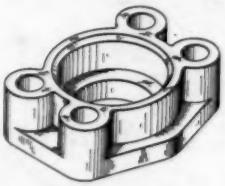
310,866
BATHROOM FAUCET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,014
Term of patent 14 years
U.S. Cl. D23—241



310,867
FAUCET SET
Joseph Strignano, New York, N.Y., assignor to I.W. Industries, Melville, N.Y.
Filed May 1, 1987, Ser. No. 45,015
Term of patent 14 years
U.S. Cl. D23—242



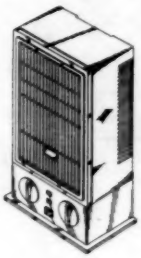
310,868
WELD FLANGE
Don R. Wilder, 1881 N. Ukiah Way, Upland, Calif. 91783
Filed May 21, 1987, Ser. No. 52,742
Term of patent 14 years
U.S. Cl. D23—265



310,869
TOILET TRAINING SEAT FOR CHILDREN
Mark Sedlack, Macedonia, Ohio, assignor to Century Products Company, Macedonia, Ohio
Filed Nov. 1, 1988, Ser. No. 265,723
Term of patent 14 years
U.S. Cl. D23—296

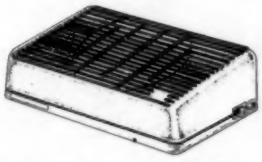
310,870
TOILET
Mark A. Zmuda, and Mary J. Reid, both of Sheboygan, Wis., assignors to Kohler Co., Kohler, Wis.
Filed Oct. 14, 1987, Ser. No. 108,738
Term of patent 14 years
U.S. Cl. D23—300

310,871
FAN HEATER
Su-Liang Liu, 6F-4, No. 102, Nan King East Rd., Sec. 5, Taipei, Taiwan
Filed Oct. 20, 1988, Ser. No. 260,543
Term of patent 14 years
U.S. Cl. D23—335

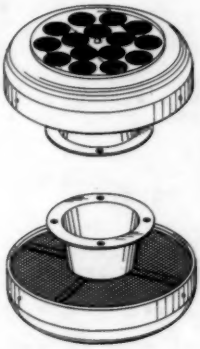


310,872
AIR FRESHENER DOLL
Sherna F. Cain, Van Buren, Ark., assignor to Triple H Industries, Inc., Van Buren, Ark.
Filed Mar. 3, 1987, Ser. No. 21,028
Term of patent 14 years
U.S. Cl. D23—368

310,873
FAN
Christophe K. J. Asselbergs, Calgary, Canada, assignor to Suncourt Holdings Inc., Calgary, Canada
Filed Sep. 9, 1988, Ser. No. 242,299
Claims priority, application Canada, Mar. 10, 1988, 10-03-88-6
Term of patent 14 years
U.S. Cl. D23—370



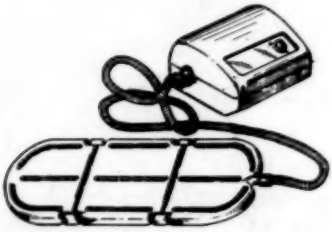
310,874
SOLAR POWERED ROOF VENT FAN
James E. Utley, Jr., 228 Day St., Tallahassee, Fla. 32304
Filed Sep. 14, 1988, Ser. No. 244,469
Term of patent 14 years
U.S. Cl. D23—376



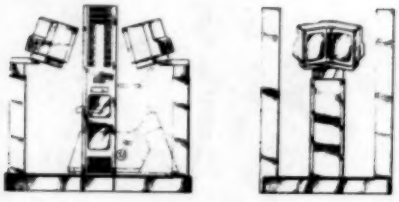
310,875
STANDUP DENTAL APPLIANCE
Jack E. Hokanson, 1147 Fewtrell Dr., Campbell, Calif. 95008
Filed May 19, 1988, Ser. No. 196,991
Term of patent 14 years
U.S. Cl. D24—10

310,876
DENTAL SYRINGE
John Jervis, Fort Collins, Colo., assignor to Perio Dental, Inc., Fort Collins, Colo.
Filed Sep. 6, 1988, Ser. No. 240,246
Term of patent 14 years
U.S. Cl. D24—14

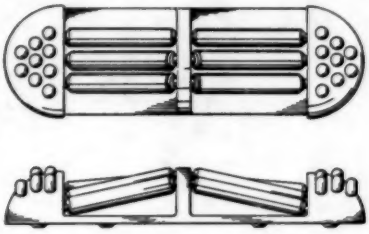
310,877
HYDRO-MASSAGE APPLIANCE
Kevin E. Reeves, Trumbull, Conn., and Harold G. Young, South Plainfield, N.J., assignors to TRC Acquistion Corporation, Atlanta, Ga.
Filed Oct. 19, 1987, Ser. No. 110,766
Term of patent 14 years
U.S. Cl. D24—38



310,878
COMBINED TANNING AND EXERCISE STATION
Larry D. Young, 1917 North Silverwood, Orange, Calif. 92665
Filed Jun. 10, 1988, Ser. No. 204,783
Term of patent 14 years
U.S. Cl. D24—39

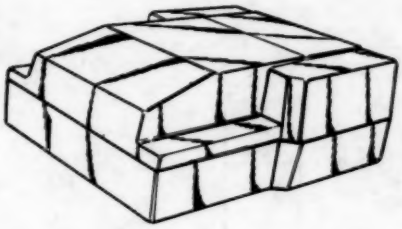


310,879
FOOT MASSAGER
John W. Matlock, Edmonton, Canada, assignor to International Network Marketing
Filed Dec. 17, 1987, Ser. No. 134,168
Claims priority, application Canada, Jun. 18, 1987, 18-06-87-5
Term of patent 14 years
U.S. Cl. D24—36



310,880
DIAPER COVER
Chester A. Majewski, 5124 Karen Dr., Fort Worth, Tex. 76118
Filed Jan. 22, 1988, Ser. No. 146,798
Term of patent 14 years
U.S. Cl. D24—50

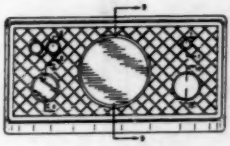
310,881
SPIKE TRANSFER HOUSING FOR USE IN PERITONEAL DIALYSIS OR THE LIKE
Mark E. Larkin, 419 Northgate, Lindenhurst, Ill. 60046, and Robert G. Bergen, 2625 Mapletree Ct., Cincinnati, Ohio 45236
Filed Jan. 15, 1988, Ser. No. 144,448
Term of patent 14 years
U.S. Cl. D24—51



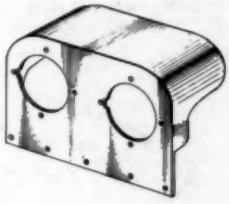
310,882
ORTHOPEDIC UNIT OR THE LIKE FOR RELIEF OF BACK AILMENT
John A. Pope, 4 Karee Court, Greensborough, Victoria, Australia
Filed Apr. 8, 1987, Ser. No. 35,726
Claims priority, application Australia, Dec. 11, 1986, 7883/86
Term of patent 14 years
U.S. Cl. D24—64

310,883
FINGER SPLINT
Kenneth W. Ellis, #1 Schroeder Estates, Kearney, Nebr. 68847
Filed Aug. 9, 1988, Ser. No. 230,120
Term of patent 14 years
U.S. Cl. D24—64

310,884
COVER FOR TOPS OF LADDERS
Russell S. Patton, Jamestown; Dale R. King, and Edward E. Heald, both of Greenville, all of Pa., assignors to R. D. Werner Co., Inc., Greenville, Pa.
Filed Sep. 24, 1987, Ser. No. 100,432
Term of patent 14 years
U.S. Cl. D25—68



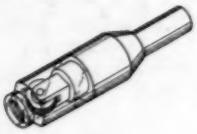
310,885
HOUSING FOR DUAL VEHICLE WARNING LIGHTS
Joseph E. Bander, 333 Holiday Dr., Springfield, Ohio 45505
Filed Jun. 3, 1988, Ser. No. 202,064
Term of patent 14 years
U.S. Cl. D26—139



310,886
ARTICULATED TABLE LAMP
Ernesto Gismondi, Milan, Italy, and John T. Bissell, Los Angeles, Calif., assignors to Artemide S.p.A., Milan, Italy
Filed Dec. 12, 1988, Ser. No. 283,756
Claims priority, application Italy, Jun. 10, 1988, 21407 B/88
Term of patent 14 years
U.S. Cl. D26—65

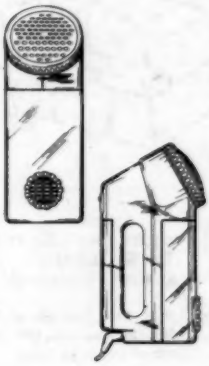
310,887
EXTERIOR LIGHTING FIXTURE
Emilio F. Paris, Barcelona, Spain, assignor to Hijo De E.F. Escofet S.A., Barcelona, Spain
Filed Nov. 30, 1988, Ser. No. 278,163
Claims priority, application Spain, May 31, 1988, 116.104
Term of patent 14 years
U.S. Cl. D26—68

310,888
LIGHTER
Shintaro Tsuji, Tokyo, Japan, assignor to Sanrio Company, Ltd., Tokyo, Japan
Filed Aug. 5, 1988, Ser. No. 229,029
Term of patent 14 years
U.S. Cl. D27—158

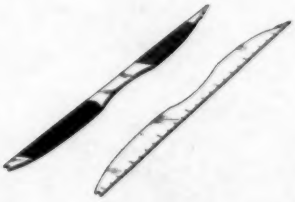


310,889
COMBINATION RAZOR AND SHAVING CREAM DISPENSER
Thomas Concialdi, 6119 S. Albany, Chicago, Ill. 60629
Filed Feb. 18, 1988, Ser. No. 156,945
Term of patent 14 years
U.S. Cl. D28—45

310,890
ELECTRIC LINT REMOVER
Elizabeth Ho, Kowloon, Hong Kong, assignor to Windmere Corporation, Hialeah, Fla.
Filed Feb. 16, 1988, Ser. No. 155,695
Claims priority, application United Kingdom, Dec. 9, 1987, 1046948; Jan. 14, 1988, 1047708
Term of patent 14 years
U.S. Cl. D28—50

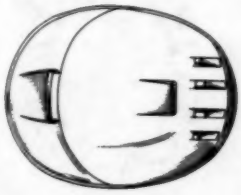


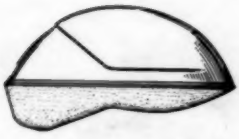
310,891
COMBINATION TOOL
Anthony Varick, 662 Essex Ct., Warrenton, Va. 22186
Filed Sep. 16, 1988, Ser. No. 245,542
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D28—59

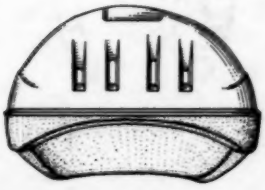


310,892
COMBINATION TOOL
Anthony Varick, 622 Essex Ct., Warrenton, Va. 22186
Filed Sep. 16, 1988, Ser. No. 245,543
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D28—59

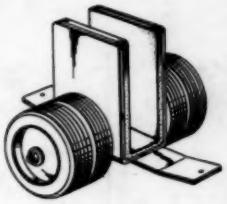
310,893
CYCLIST'S VENTILATED HELMET
Lester V. Broersma, Bellflower, Calif., assignor to Bell Bicycles Inc., Norwalk, Calif.
Filed Oct. 16, 1987, Ser. No. 109,254
Term of patent 14 years
U.S. Cl. D29—12





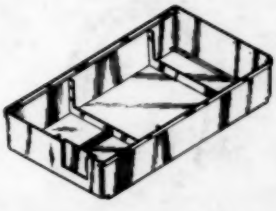


310,894
DOOR DOLLY
Ramon R. Smith, 14935 W. 155th Ter., Olathe, Kans. 66062
Filed Jul. 6, 1988, Ser. No. 215,946
Term of patent 14 years
U.S. Cl. D34—23



310,895
LUGGAGE CARRIER
Osamu Iwaki, Nagoya, Japan, assignor to Kobayashi Hansokiki Co., Ltd., Japan
Filed Oct. 14, 1988, Ser. No. 262,339
Claims priority, application Japan, Apr. 15, 1988, 63-15509
Term of patent 14 years
U.S. Cl. D34—26

310,896
TRAY
Jack Winjum, 117 E. Salem, Indianola, Iowa 50125
Filed Jun. 13, 1988, Ser. No. 206,331
Term of patent 14 years
U.S. Cl. D34—46



310,897
FASTENER FOR USE IN MAINTAINING TENSION IN A CLOTHESLINE OR SIMILAR ARTICLE
Michael R. Bell, Box 184 R.F.D. #2, Houlton, Me. 04730
Filed Jun. 22, 1988, Ser. No. 211,395
Term of patent 14 years
U.S. Cl. D32—60

310,898
HORSESHOE FOR A HIND HOOF
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051
Filed Jun. 8, 1988, Ser. No. 203,868
Term of patent 14 years
U.S. Cl. D30—147

310,899
HORSESHOE FOR A FRONT HOOF
Joseph Kulak, 73 Buell St., New Britain, Conn. 06051
Filed Jun. 8, 1988, Ser. No. 203,867
The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.
Term of patent 14 years
U.S. Cl. D30—148

310,900

HORSESHOE FOR A FRONT HOOF

Joseph Kulak, 73 Beull St., New Britain, Conn. 06051

Filed Jun. 8, 1988, Ser. No. 203,873

The portion of the term of this patent subsequent to Sep. 25, 2004, has been disclaimed.

Term of patent 14 years

U.S. Cl. D30—147

310,901

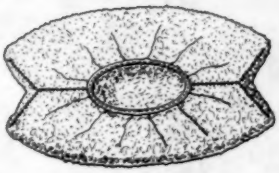
FLEXIBLE COVER FOR A SPONGE MOP

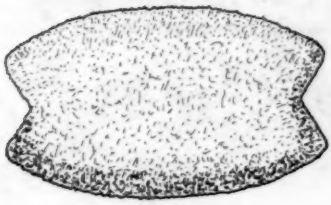
Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North Brunswick, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.

Filed Apr. 14, 1988, Ser. No. 181,992

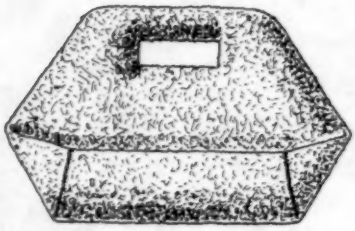
Term of patent 14 years

U.S. Cl. D32—40

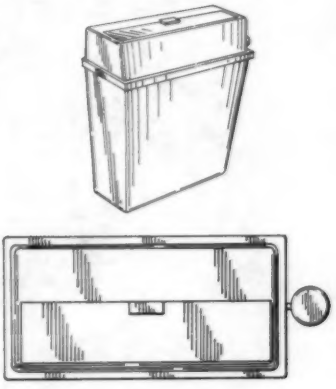




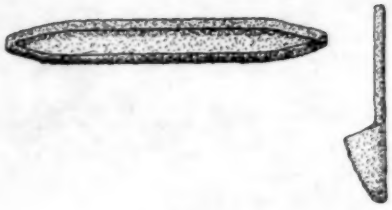
310,902
FLEXIBLE COVER FOR A SPONGE MOP
Francis P. Paciullo, Middlesex, and Ligia A. Rivera, North Brunswick, both of N.J., assignors to Colgate-Palmolive Company, Piscataway, N.J.
Filed Apr. 14, 1988, Ser. No. 183,027
Term of patent 14 years
U.S. Cl. D32—40



310,903
WASTE RECEPTACLE
Robert S. Anderson, Wauconda, Ill., assignor to Premium Plastics, Inc., Chicago, Ill.
Filed Mar. 1, 1988, Ser. No. 162,465
Term of patent 14 years
U.S. Cl. D34—9



310,904
CART FOR SNOWMOBILES OR THE LIKE
George N. Dinges, Mead, Wash., assignor to Pattco, Inc., Mead, Wash.
Filed Apr. 21, 1988, Ser. No. 184,155
Term of patent 14 years
U.S. Cl. D34—12



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

: *See*—
Oxenrider, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.
Steininger, Helmut; and , 4,959,243, Cl. 427-48.000.

A.I.R. Foundation: *See*—
Muller, George H., 4,959,067, Cl. 606-190.000.

AB A.Svensson & Co.: *See*—
Hannersbg, Christer, 4,958,646, Cl. 160-348.000.

Abdel-Malik, Magdy M.: *See*—
Yalpani, Manssur; and Abdel-Malik, Magdy M., 4,959,461, Cl. 536-18.700.

Abe, Hideo: *See*—
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.

Abe, Hiraku: *See*—
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.

Abe, Shinichi: *See*—
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.

Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, to Mitsubishi Yuka Badische Company, Ltd. Emulsion polymerization process. 4,959,428, Cl. 526-201.000.

Abiru, Masao: *See*—
Yamamoto, Tameyuki; and Abiru, Masao, 4,959,220, Cl. 424-490.000.

Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, to Mt. Sinai School of Medicine of the City University of New York. Production and use of pre S polypeptides of hepatitis B virus. 4,959,323, Cl. 435-320.000.

Acumet Precision Instruments Limited: *See*—
Skrgatic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.

Acushnet Company: *See*—
Giza, John P., 4,959,000, Cl. 425-116.000.

Acustar, Inc.: *See*—
Markow, Paul A.; and Nolle, William, 4,958,777, Cl. 242-7.110.

Adachi, Meiro: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.

Adachi, Sakashi, to Toshiba Kikai Kabushiki Kaisha. Spindle feed mechanism for a machine tool. 4,958,967, Cl. 409-185.000.

Adams, Louis R., to Astro Aerospace Corporation. Truss structure. 4,958,474, Cl. 52-646.000.

Adcock, Mark W., to Eastman Kodak Company. Field inversion electroblotting & electroelution. 4,959,133, Cl. 204-182.800.

Adeka Argus Chemical Co., Ltd.: *See*—
Shibata, Toshihiro; Furosawa, Norio; and Kimura, Masaki, 4,959,173, Cl. 252-299.650.

Adir et lie: *See*—
Vincent, Michel; Remond, Georges; and Laubie, Michel, 4,959,372, Cl. 514-299.000.

Adler-Nissen, Jens L.: *See*—
Frokjaer, Sven; Eriksen, Svend; and Adler-Nissen, Jens L., 4,959,350, Cl. 514-2.000.

Adlersberg, Shabtai: *See*—
Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, 4,959,865, Cl. 381-46.000.

Admassu, Wudneh; and Clark, Daniel O., to Dow Chemical Company, The. Polycarbonate gas separation membranes containing substituted benzenes and processes for making and using the same. 4,959,082, Cl. 55-16.000.

Advanced Micro Devices, Inc.: *See*—
Moyal, Miki, 4,959,650, Cl. 341-126.000.

Advanced Products Inc.: *See*—
Frentzel, Richard L.; and Peralta, Noel C., 4,959,178, Cl. 252-514.000.

Advanced Surgical Intervention, Inc.: *See*—
Rosenbluth, Robert F.; and Cox, Brian J., 4,958,630, Cl. 128-79.000.

Aerospatiale Societe Nationale Industrielle: *See*—
Labrot, Maxime; Feuillerat, Jean; and Valvy, Yves, 4,958,767, Cl. 239-13.000.

AGA AB: *See*—
MacNeal, James R.; Rack, Timothy P.; and Corns, Ronald R., 4,959,101, Cl. 75-685.000.

Agata, Akira: *See*—
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, 4,959,438, Cl. 528-98.000.

Agence Spatiale Europeenne: *See*—
Weinberg, Alan, 4,959,765, Cl. 363-20.000.

Agency of Industrial Science & Technology: *See*—
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,959,479, Cl. 548-255.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.

Ago, Kyoichi: *See*—
Hamaie, Buji; Ago, Kyoichi; and Hatano, Kazufumi, 4,958,764, Cl. 228-248.000.

Agranat, Edward A.: *See*—
Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., 4,959,109, Cl. 156-73.400.

Ahmed, Salah H.; and Luksas, Anthony J., to Electric Power Research Institute. Method for improving the taste, texture and mouth feel of a liquid dairy product and for concentrating same. 4,959,234, Cl. 426-580.000.

Aikawa, Satoru; and Saito, Yoichi, to Nippon Telegraph and Telephone Corporation. Word syncronization system and method. 4,959,854, Cl. 371-47.100.

Aikawa, Takeshi: *See*—
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, 4,959,871, Cl. 382-59.000.

Air Products and Chemicals, Inc.: *See*—
Howells, Roger A., 4,958,466, Cl. 51-425.000.
Nordquist, Andrew F.; and Pinschmidt, Robert K., Jr., 4,959,489, Cl. 560-170.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 4,959,579, Cl. 310-323.000.

Aitkhozhin, Murat A., deceased: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Aizner, Mendel: *See*—
Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, 4,959,865, Cl. 381-46.000.

Akagawa, Minoru, to Intelmatec Corporation. Multi-disk clamp end effector. 4,958,873, Cl. 294-93.000.

Akai, Mikio; and Mori, Masami, to Ikeda Bussan Co., Ltd. Method of producing skin-covered foamed plastic article. 4,959,184, Cl. 264-40.300.

Akano, Shinichi, to Yamatake-Honeywell Co., Ltd. Current holding circuit of two-wire instrument. 4,959,649, Cl. 340-870.420.

Akimoto, Kazuo: *See*—
Seki, Yoichi; and Akimoto, Kazuo, 4,959,675, Cl. 354-400.000.

Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., to Cymer Laser Technologies. Compact excimer laser including an electrode mounted in insulating relationship to wall of the laser. 4,959,840, Cl. 372-57.000.

Akira, Nishio: *See*—
Muraoka, Takatoshi; Akira, Nishio; and Tsuji, Tomohiro, 4,958,693, Cl. 177-25.170.

Akitsu, Yasuo, to NGK Insulators, Ltd. Vibro-isolating joint. 4,958,860, Cl. 285-49.000.

Akiyama, Ryota: *See*—
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.

Akiyama, Shigeru: *See*—
Yokoyama, Yoshiharu; and Akiyama, Shigeru, 4,958,599, Cl. 123-41.500.

Akojima, Kazuo: *See*—
Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, 4,958,626, Cl. 128-24.00A.

Akzo N.V.: *See*—
Wreesmann, Carel T. J.; and Erdhuisen, Erwin W. P., 4,959,448, Cl. 528-192.000.

Alcan International Limited: *See*—
Dube, Ghyslain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,959,100, Cl. 75-10.190.
Wai, Patrick P.; and Rogers, Steven, 4,958,809, Cl. 266-229.000.

Alcatel N.V.: *See*—
Guichard, Pascal, 4,958,783, Cl. 242-157.00R.

Aldissi, Mahmoud: *See*—
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,162, Cl. 252-519.000.
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,180, Cl. 252-519.000.

Aldrich, Jay L., to Sterling Bouquet. Floral holder and display. 4,958,461, Cl. 47-41.010.

Alesi, Thomas W., Jr.: *See*—
Dannatt, Hugh S.; Alesi, Thomas W., Jr.; and Kulpa, Walter J., 4,958,782, Cl. 242-75.430.

Alfa Lancia S.p.A.: *See—*
Truzzi, Sergio; Oldani, Emilio; and Malter, Ugo, 4,958,614, Cl. 123-585.000.

Alford, George W.; and Rogers, William C. Method and apparatus for treating wells. 4,958,683, Cl. 166-247.000.

Alfred Teves GmbH: *See—*
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

Alfred University: *See—*
Bhargava, Atit; and Snyder, Robert L., 4,959,089, Cl. 65-33.000.

Algae Farms: *See—*
Nielson, Jay P.; and Sturm, Paul A., 4,958,460, Cl. 47-1.400.

Allaire, Jacky; and Kozlowskyj, Wasil, to Devanlay. Process for making socks. 4,958,507, Cl. 66-19.000.

Allen, Jonathan: *See—*
Ellis, Frank B., Jr.; Delahdy, Alan E.; Allen, Jonathan; and Volltrauer, Hermann, 4,959,112, Cl. 156-248.000.

Allen, Michael P.: *See—*
Ramel, Urs A.; Allen, Michael P.; and Singh, Prithipal, 4,959,324, Cl. 436-169.000.

Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., to Hoechst-Roussel Pharmaceuticals Inc. Aminopyridinylaminophenol compounds useful as topical antiinflammatory agents for the treatment of skin disorders. 4,959,378, Cl. 514-352.000.

Allied Colloids Ltd.: *See—*
Farrar, David; Benn, Gerald P.; and Karolia, Seraj A. M., 4,959,502, Cl. 564-127.000.

Allied-Signal: *See—*
Oxenrider, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.

Allied-Signal Inc.: *See—*
Arena, Blaine J., 4,959,467, Cl. 536-124.000.
Becker, Richard J., 4,959,572, Cl. 310-68.00D.
Park, You K., 4,959,843, Cl. 375-59.000.

Allison, Anthony C.: *See—*
Nelson, Peter H.; Allison, Anthony C.; Engui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 524-469.000.

Almaguer, Michael J.: *See—*
Lentz, Gary J.; and Almaguer, Michael J., 4,958,555, Cl. 98-121.100.

Aloup, Jean-Claude: *See—*
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Alpia S.A.: *See—*
Bruneau, Alain, 4,958,795, Cl. 248-317.000.

Alps Electric Co., Ltd.: *See—*
Obouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, 4,959,805, Cl. 364-562.000.
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.
Tsuji, Masato, 4,959,116, Cl. 156-283.000.

Altenburger, John W.: *See—*
Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., 4,958,654, Cl. 137-72.000.

Alternative Industrial Devices for Safety, Inc.: *See—*
Daigle, Joseph, 4,959,647, Cl. 340-825.720.

Alza Corporation: *See—*
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,959,218, Cl. 424-473.000.

Amachi, Nobumitsu: *See—*
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.

Amada Company, Limited: *See—*
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.

Amano, Fumio: *See—*
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.

Amansol Enterprises No. 17 Ltd.: *See—*
Salisbury, Richard S.; and Prees, Michael R., 4,959,791, Cl. 364-519.000.

Amcor Limited: *See—*
McKinlay, Peter R., 4,958,522, Cl. 73-847.000.

Amer, Moh. S. High dietary fiber low lactose liquid food and a method of producing same. 4,959,227, Cl. 426-35.000.

American Cyanamid Company: *See—*
Curran, William V., 4,959,495, Cl. 562-560.000.
Doehner, Robert F., Jr., 4,959,476, Cl. 546-167.000.

American Home Products Corporation: *See—*
Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., 4,959,051, Cl. 604-77.000.

American Screen Printing Company: *See—*
Bubley, Henry J.; Glotzbach, Joseph; and Motev, Phil, 4,958,559, Cl. 101-123.000.

American Standard Inc.: *See—*
Fait, Claudio, 4,958,387, Cl. 4-236.000.

Ammermann, Eberhard: *See—*
Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.

Amoco Corporation: *See—*
Harris, James E.; and Winslow, Paul A., 4,959,423, Cl. 525-471.000.
Kukes, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., 4,959,140, Cl. 208-59.000.
Matzner, Markus; and Papuga, Donald M., 4,959,424, Cl. 525-471.000.

Amonett, Daniel K.: *See—*
Cole, Ronald E.; Amonett, Daniel K.; and Smock, Steven W., 4,959,512, Cl. 200-38.00R.

Amos, Dennis R.: *See—*
Clark, Robert E.; and Amos, Dennis R., 4,958,431, Cl. 29-889.100.

AMP Incorporated: *See—*
Grabbe, Dimitry G., 4,959,029, Cl. 439-862.000.
Kreinberg, Earl R., 4,959,026, Cl. 439-651.000.
Walp, Patrick K., 4,959,844, Cl. 375-97.000.

Ampex Corporation: *See—*
Bennett, Phillip P., 4,959,718, Cl. 358-148.000.
Davis, John E., 4,959,774, Cl. 364-200.000.

Amthor, Helmut K., to Eveready Battery Company, Inc. Battery assembly. 4,959,280, Cl. 429-27.000.

Andermo, Nils I., to Micro Encoder, Inc. Electrode structure for capacitance-type measurement transducers. 4,959,615, Cl. 324-690.000.

Andersen Corporation: *See—*
Plummer, David D., 4,958,469, Cl. 52-213.000.

Anderson, Charles A. Downhole stabilizers. 4,958,692, Cl. 175-323.000.

Anderson, Jeffrey R. Archery arrow and sabot. 4,958,617, Cl. 124-24.100.

Anderson, John M., to General Electric Company. Luminaire for an electrodeless high intensity discharge lamp. 4,959,584, Cl. 313-160000.000.

Anderson, John M.; and Roberts, Victor D., to General Electric Company. Starting electrodes for HID lamps. 4,959,592, Cl. 315-248.000.

Anderson, Robert D., to Facet Quantek, Inc. Fuel filter with positive water shutoff. 4,959,141, Cl. 210-109.000.

Anderson, Vincent P.; and Cordill, Rexford W., to Whirlpool Corporation. Refrigerator cabinet flange reinforcement bar. 4,958,890, Cl. 312-214.000.

Ando, Satoshi: *See—*
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.

Andreas Stihl: *See—*
Hoppner, Klaus; Friedrich, Reinhard; and Weiss, Hermann, 4,958,602, Cl. 123-195.00C.

Andrews, Edward A. Tool holder bushing. 4,958,966, Cl. 408-239.00A.

Angell, Cyril N. E., to Avon Industrial Polymers Limited. Valve for respirator. 4,958,633, Cl. 128-201.190.

Annis, Jeffrey R.; Herman, Timm R.; and Strobel, Ronald T., to Snap-on Tools Corporation. Electronic torque wrench with tactile indication. 4,958,541, Cl. 81-479.000.

Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., to General Electric Company. Resistance heater for diamond production by CVD. 4,958,592, Cl. 118-724.000.

Antibióticos, S.A.: *See—*
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.

Antosh, Mark J. Transit vehicle apparatus and method for solar induction monorails. 4,958,575, Cl. 104-288.000.

Aoi, Tomio; and Kameda, Toshihiro, to Honda Giken Kogyo Kabushiki Kaisha. Fuel pump having improved shaft/impeller coupling. 4,958,984, Cl. 415-55.100.

Aoki, Atsuhito, to Ryobi Ltd. Fishing reel drag mechanism. 4,958,785, Cl. 242-295.000.

Aoki, Masahiro: *See—*
Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, 4,959,428, Cl. 526-201.000.

Aoki, Naofumi: *See—*
Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, 4,959,672, Cl. 354-173.100.

Aoki, Yoshio: *See—*
Horimai, Hideyoshi; and Aoki, Yoshio, 4,959,820, Cl. 369-13.000.

Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, to Fuji Photo Film Co., Ltd. Magnetic recording medium. 4,959,263, Cl. 428-329.000.

Aoyagi, Nobutoshi: *See—*
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokozi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.

AP Parts Manufacturing Company: *See—*
Moring, Walter G., III, 4,958,701, Cl. 181-282.000.

Apley, Philip G.; Berlow, David A.; and Collins, John S., to Bitstream Inc. Outline-to-bitmap character generator. 4,959,801, Cl. 364-518.000.

Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., to Raynet Corporation. Clock recovery apparatus including a clock frequency adjuster. 4,959,846, Cl. 375-118.000.

Aprica Kassai Kabushikikaisha: *See—*
Kassai, Kenzou, 4,958,885, Cl. 297-55.000.

APV U.K. Limited: *See—*
Stirling, Robert; and Coombes, Steven A., 4,959,525, Cl. 219-291.000.

Aquanautics Corporation: *See—*
Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.

Aquino, Agostino; and Lang, Karl U., to Nabisco Brands, Inc. Filled cracker making apparatus. 4,958,556, Cl. 99-355.000.

Aquino, Agostino; and Lang, Karl U., to Nabisco Brands, Inc. Filled cracker making process. 4,959,235, Cl. 426-281.000.

Arai, Hideyuki: *See*—
Takahashi, Koji; Konuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.

Arai, Hiromichi, to Catalysts and Chemicals Inc. Heat-resistant noble metal catalyst and method of producing the same. 4,959,339, Cl. 502-302.000.

Arai, Mitsuru; Cassidy, Patrick E.; and Farley, James M., to Nippon Steel Corporation. Copoly(imidine-imide). 4,959,447, Cl. 528-188.000.

Arakawa, Kazuhiko: *See*—
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Arakawa, Satoshi; and Takahashi, Kenji, to Fuji Photo Film. Co., Ltd. Radiation image read-out apparatus. 4,959,545, Cl. 250-327.200.

Araki, Hiroaki: *See*—
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Arao, Kozo: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasuhi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.

Arasmith, Stanley. Grate knife for use with winged cutting knife for producing wood chips or flakes. 4,958,775, Cl. 241-88.100.

Arco Chemical Technology, Inc.: *See*—
White, John F., 4,959,466, Cl. 536-119.000.

Ardac, Inc. (Dixie-Narco, Inc.): *See*—
Suris, Vladimir, 4,958,715, Cl. 194-206.000.

Ardini, Joseph L., Jr.; and Small, Steven, to Prime Computer, Inc. Write buffer for a digital processing system. 4,959,771, Cl. 364-200.000.

Arena, Blaise J., to Allied-Signal Inc. Control of product selectivity in the addition of HCN to arabinose. 4,959,467, Cl. 536-124.000.

Arimoto, Akira: *See*—
Saito, Susumu; and Arimoto, Akira, 4,959,665, Cl. 346-108.000.

Arimoto, Sachiro: *See*—
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.

Aritomi, Toshiaki, to Hitachi, Ltd. MR examining apparatus of heart beat synchronous type. 4,958,637, Cl. 128-653.00A.

Arizona Chemical Company: *See*—
Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., 4,959,412, Cl. 525-98.000.

Armes, Steven P.; and Aldissi, Mahmoud, to United States of America, Energy. Colloidal polypyrrole. 4,959,162, Cl. 252-519.000.

Armes, Steven P.; and Aldissi, Mahmoud, to United States of America, Energy. Colloidal polyaniline. 4,959,180, Cl. 252-519.000.

Armstrong, Mark L.: *See*—
Smothers, William K.; Doraiswamy, Krishna C.; Armstrong, Mark L.; and Trout, Torence J., 4,959,283, Cl. 430-1.000.

Armstrong, Molly P.: *See*—
Heinzman, Stephen W.; Eis, Michael J.; and Armstrong, Molly P., 4,959,409, Cl. 525-61.000.

Arnett, G. William; Buss, Rick A.; and Bruce, Robert A., to Techmedica, Inc. Bone plate with positioning member. 4,959,065, Cl. 606-69.000.

Aronson, Michael P.; Cardinali, Martin S.; and McCown, Jack T., to Lever Brothers Company. Stabilized enzymes liquid detergent composition containing lipase and protease. 4,959,179, Cl. 252-135.000.

Arrizon-Lopez, Vivian: *See*—
Slocum, Robert H.; Lee, Patrick L. Y.; and Arrizon-Lopez, Vivian, 4,959,176, Cl. 252-389.530.

Arrowsmith, John E.: *See*—
Cross, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., 4,959,366, Cl. 514-239.500.

Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., to General Electric Company. Reflective lamps having an improved light source mounting arrangement. 4,959,583, Cl. 313-113.000.

Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., to Arizona Chemical Company. High shear tackifier resins. 4,959,412, Cl. 525-98.000.

Artromick International, Inc.: *See*—
Taylor, Marc D.; and Beardsley, Duane, 4,958,891, Cl. 312-287.000.

Aruga, Tamotsu; Sasaki, Masaomi; and Hashimoto, Mitsuru, to Ricoh Company, Ltd. Benzylideneindene compounds and electrophotographic photoconductor using the same. 4,959,290, Cl. 430-73.000.

Asaba, Yutaka; and Chikamura, Masaharu, to Juki Corporation. Sewing machine lateral feed apparatus. 4,958,580, Cl. 112-314.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Nishimura, Katsuhiko; Shinho, Kazuyuki; and Kita, Masahiro, 4,959,695, Cl. 355-327.000.

Asaka, Nobuyoshi: *See*—
Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, 4,959,713, Cl. 358-108.000.

Asakura, Koichi: *See*—
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.

Asakura, Tsutou: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,959,722, Cl. 358-211.000.

Ascom Autelca AG.: *See*—
Haueter, Ernst, 4,958,976, Cl. 414-331.000.

Ashcraft, Thomas L., Jr.: *See*—
Parnell, Margaret B.; Ashcraft, Thomas L., Jr.; and Webber, Kenneth M., 4,959,490, Cl. 562-74.000.

Ashida, Takashi; Kimishi, Noriyuki; and Yamamoto, Koji, to Idemitsu Petrochemical Co., Ltd. Multistage process for producing polycarbonate from oligomer. 4,959,456, Cl. 528-371.000.

Asta Pharma AG: *See*—
Sauerbier, Dieter; Isaac, Otto; and Brade, Wolfgang P., 4,959,215, Cl. 424-422.000.

Asten Group, Inc.: *See*—
Dufour, Marcel, 4,958,673, Cl. 162-358.000.

Astro Aerospace Corporation: *See*—
Adams, Louis R., 4,958,474, Cl. 52-646.000.

AT&T Bell Laboratories: *See*—
Bhusri, Gurcharan S., 4,959,849, Cl. 379-32.000.
Bischoff, Raymond B.; and Chan, Norman C., 4,959,856, Cl. 379-245.000.
Cobb, Gary S.; and Thomas, Phillip M., 4,958,903, Cl. 350-96.200.
Daudelin, Abraham N., 4,959,855, Cl. 379-213.000.
Erving, Richard H.; and Miller, Robert R., II, 4,959,857, Cl. 379-390.000.
Fuchs, Harold E.; and McAnany, Robert E., 4,959,129, Cl. 204-28.000.
Khoury, John M., 4,959,623, Cl. 330-265.000.
Lentine, Anthony L.; and Miller, David A. B., 4,959,534, Cl. 250-213.00A.
Schmidt, Douglas C., 4,959,555, Cl. 307-219.000.
Tol, Simon J. M.; and Wouda, Kornelis J., 4,959,845, Cl. 375-106.000.

AT&T Information Systems Inc.: *See*—
Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., 4,959,852, Cl. 379-70.000.

Atco Products, Inc.: *See*—
Hamilton, Jerry W., 4,958,861, Cl. 285-175.000.

Atlantic Richfield Company: *See*—
Lowther, Frank E., 4,958,653, Cl. 137-13.000.

Atochem North America, Inc.: *See*—
Thomapon, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.

Auerbach, Abraham E. CRT or computer monitor accessory tray. 4,958,737, Cl. 206-557.000.

Auge, Jacques: *See*—
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.

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Pantini, Giovanni; and Savonelli, Susanna, 4,959,171, Cl. 252-174.000.
Re, Alberto; and De Giorgi, Marco, 4,959,426, Cl. 525-527.000.

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Autoflug GmbH: *See*—
Siebrand, Gerhard; and Sturzenbecher, Bruno, 4,958,566, Cl. 102-400.000.

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Cooke, Richard D.; and Higginbottom, Charles, 4,958,714, Cl. 192-111.00A.
Leigh-Monstevens, Keith V., 4,959,188, Cl. 264-255.000.

Automotive Systems Laboratory, Inc.: *See*—
Behr, Leonard W.; and White, Craig W., 4,958,851, Cl. 280-735.000.

Avdel Limited: *See*—
Lacey, Raymond D.; and Bradley, William D., 4,958,971, Cl. 411-38.000.

Avdel Systems Limited: *See*—
Denham, Keith; Savage, Donald S.; and Shortland, John A., 4,958,510, Cl. 72-391.400.

Avon Industrial Polymers Limited: *See*—
Angell, Cyril N. E., 4,958,633, Cl. 128-201.190.

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Axelrod, Robert J.; Jaquiss, Donald B. G.; and Tyrell, John A., to General Electric Company. Flame retardant compounds and thermoplastic compositions containing the same. 4,959,481, Cl. 548-462.000.

Axelson, Bygg S. Method of breaking up bundles of adherent hard fibers and an oscillating screen. 4,958,935, Cl. 366-154.000.

Axial Electric, Inc.: *See*—
Varga, Joseph S., 4,959,578, Cl. 310-268.000.

AXIC Inc.: *See*—
Parobek, Lubomir, 4,959,848, Cl. 378-46.000.

Azuma, Hideto: *See*—
Nishi, Yoshio; Azuma, Hideto; and Omaru, Atsuo, 4,959,281, Cl. 429-194.000.

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Janda, Dennis J., 4,959,395, Cl. 521-54.000.

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Rinderer, Eric R., 4,958,792, Cl. 248-74.200.

Babcock Industries, Inc.: *See*—
Baumgarten, John M., 4,958,536, Cl. 74-501.50R.

Babcock, James W.: *See*—
Dzarnoski, John E., Jr.; and Babcock, James W., 4,959,749, Cl. 361-396.000.

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Colli, Luici; Badiali, Roberto; and Marangone, Nereo, 4,958,779, Cl. 242-035.60R.

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Bagnott, George T., to Import-Export, Research & Development, Inc. Display frame system. 4,959,763, Cl. 362-382.000.

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Nix, Charles D.; and Baker, Johnny P., 4,958,790, Cl. 248-56.000.

Baker, Quentin A.: *See*—
O'Neal, Glenn B.; Baker, Quentin A.; Mecredy, Henry E., III; and Terna, Daniele, 4,958,605, Cl. 123-300.000.

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Madden, James J., III, 4,958,388, Cl. 2-239.000.

Balz, Richard C. Remotely activated television swivel base. 4,959,645, Cl. 340-825.720.

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Fett, Jurgen; Oelschlager, Karl G.; and Bannert, Wolfgang, 4,958,726, Cl. 198-852.000.

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Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,959,469, Cl. 540-222.000.

Barakitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, to GTE Products Corporation. Glow discharge starter having discharge extinguishing means. 4,959,589, Cl. 315-58.000.

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Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppa; and Murti, Dasarao K., 4,959,288, Cl. 430-59.000.

Barattini, Anna; and Rossi, Anna M. Elastic foldable covers for motor-car seats. 4,958,886, Cl. 297-229.000.

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Lesins, Robert R.; and Barlament, Steven M., 4,958,804, Cl. 254-120.000.

Barlow, Charles G.: *See*—
Lea, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoog, Ivan H., 4,959,294, Cl. 430-204.000.

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Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.
Hoffmann, Gerhard, 4,959,285, Cl. 430-11.000.
Lubisch, Wilfried; Binnig, Fritz; and von Philipsborn, Gerda, 4,959,373, Cl. 514-300.000.
Martiachina, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,959,098, Cl. 71-95.000.
Steininger, Helmut; and , 4,959,243, Cl. 427-48.000.
Taubitz, Christof; Seiler, Erhard; Hambrecht, Juerges; Mitulla, Konrad; and Boehlke, Klaus, 4,959,415, Cl. 525-133.000.

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Bassett, John A., to Computer Products, Inc. DC/DC converter switching at zero voltage. 4,959,764, Cl. 363-16.000.

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Brandon, David L.; Bates, Anne H.; and Friedman, Mendel, 4,959,310, Cl. 435-7.000.

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Bobo, Donald E., Jr., 4,959,050, Cl. 604-49.000.
Willing, Richard S., 4,959,804, Cl. 364-557.000.

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Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.
Foltin, Eckard; Depcik, Hans-Werner; Huff, Karl; Pischtschan, Alfred; Yesildag, Mehmet C.; and Erkelenz, Reiner, 4,959,406, Cl. 524-413.000.
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 4,959,430, Cl. 526-257.000.
Lindner, Christian; Ott, Karl-Heinz; Wittmann, Dieter; and Braese, Hans-Eberhard, 4,959,418, Cl. 525-282.000.
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Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.
Wagner, Klaus; and Hanauer, Gerd, 4,959,379, Cl. 514-367.000.

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Nilsson, Karl E., 4,959,011, Cl. 431-263.000.

Bayly, Peter K., to Kingsley Nominees Pty. Ltd. Container closure. 4,958,744, Cl. 220-305.000.

Beardsley, Duane: *See*—
Taylor, Marc D.; and Beardsley, Duane, 4,958,891, Cl. 312-287.000.

Beavers, Ellington M.: *See*—
Halpern, Gergory; Campbell, Charles; Beavers, Ellington M.; and Chen, Huk Y., 4,959,074, Cl. 623-66.000.

Becker, Horst: *See*—
Exner, Karl-Christoph; Reichow, Franz; and Becker, Horst, 4,959,519, Cl. 219-110.000.

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Samarov, Victor M.; Doumani, George A., Jr.; and Becker, Philip F., 4,959,752, Cl. 361-424.000.

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Becker, Samuel R. Boring apparatus and method of modifying concrete blocks. 4,958,467, Cl. 52-127.700.

Beckman Instruments, Inc.: *See*—
Slocum, Robert H.; Lee, Patrick L. Y.; and Arrizon-Lopez, Vivian, 4,959,176, Cl. 252-389.530.

Becton, Dickinson and Company: *See*—
Williams, Joel L.; and Titus, George R., 4,959,402, Cl. 524-99.000.

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Berge, John M., 4,959,374, Cl. 514-307.000.
King, Francis D., 4,959,367, Cl. 514-243.000.

Behr, Leonard W.; and White, Craig W., to Automotive Systems Laboratory, Inc. Air bag firing circuit. 4,958,851, Cl. 280-735.000.

Behr, R. Douglas: *See*—
Smith, David A.; Geiger, Herbert B.; and Behr, R. Douglas, 4,959,044, Cl. 493-194.000.

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Belan, Katalin. Pet grooming kit with applicator. 4,958,596, Cl. 119-86.000.

Belanger, David J.: *See*—
Vaidya, Jayant; and Belanger, David J., 4,959,605, Cl. 322-10.000.

Bell & Howell Company: *See*—
Christensen, Dean; Helffrich, David J.; Scullion, Christopher K.; and Hindle, Edward W., 4,959,795, Cl. 364-464.030.

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Bendel, Lee; and Stoffel, Florence, to Ethicon, Inc. Sterile surgical needle having dark non-reflective surface. 4,959,068, Cl. 606-222.000.

Benn, Gerald P.: *See*—
Farrar, David; Benn, Gerald P.; and Karolia, Seraj A. M., 4,959,502, Cl. 564-127.000.

Bennett, Phillip P., to Ampex Corporation. Video device synchronization system. 4,959,718, Cl. 358-148.000.

Benoit, Edward J. Reusable tie-all or bundle fastener. 4,958,414, Cl. 24-16.0PB.

Benson, Robert A. Fluid detecting. 4,959,639, Cl. 340-618.000.

Benson, Sidney W.: *See*—
Minet, Ronald G.; Tsotsis, Theodore T.; and Benson, Sidney W., 4,959,202, Cl. 423-502.000.

Benz, Karl: *See*—
Haueter, Walter; Pfaffhauser, Hans-Ulrich; and Benz, Karl, 4,958,443, Cl. 34-57.00D.

Berard, Paul M.; and Bhadare, Ajaib S., to Siemens Transmission Systems, Inc. Register robustness improvement circuit and method. 4,959,836, Cl. 371-69.100.

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Berg, Robin; Mohns, Lawrence; and Oswald, Richard, to Sun Refining & Marketing Company. System for underground storage and delivery of liquid product, and recovery of leakage. 4,958,957, Cl. 405-53.000.

Berge, John M., to Beecham Group P.L.C. Novel compounds. 4,959,374, Cl. 514-307.000.

Bergeron, Margaret A. Showcase for storing and displaying post-type earrings. 4,958,727, Cl. 206-6.100.

Berglund, Charles A.: *See*—
Seitz, Jerry T.; Berglund, Charles A.; and Pasztor, Andrew J., Jr., 4,959,435, Cl. 526-347.200.

Bergman, Norman J.: *See*—
DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., 4,959,600, Cl. 318-625.000.

Bergmann, Heinrich M. G.: *See*—
Langlois, Jacques A. E.; Bergmann, Heinrich M. G.; and Nuhn, Wolfgang, 4,959,001, Cl. 425-147.000.

Beritashvili, David R.: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Berke, Joseph J.: *See*—
Muller, George H., 4,959,067, Cl. 606-190.000.

Berkner, Kathleen L.: *See*—
Foster, Donald C.; Murray, Mark J.; and Berkner, Kathleen L., 4,959,318, Cl. 435-69.100.

Berlow, David A.: *See*—
Apley, Philip G.; Berlow, David A.; and Collins, John S., 4,959,801, Cl. 364-518.000.

Bernard, Robin D.; and Gardner, John G., to Filtercorp, Inc. Cooking oil filtration device having locking means and peripheral channel means. 4,959,144, Cl. 210-232.000.

Bernosky, John. Coupling or connector for securing a load-bearing support to a head of a bolt. 4,958,796, Cl. 248-317.000.

Berwald, Ernst; and Lewe, Winfried, to Schering Aktiengesellschaft. Container with safety valve. 4,958,742, Cl. 220-209.000.

Beth Israel Hospital Assn.: *See*—
Carey, Martin C.; Moses, Alan C.; and Flier, Jeffrey S., 4,959,358, Cl. 514-171.000.

Betterton, Bruce E.: *See*—
Clarkson, James H.; Rhodes, Kenneth R.; Betterton, Bruce E.; and Foster, Richard B., 4,959,102, Cl. 75-649.000.

Beyers, Billy W., Jr.: *See*—
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Bhadare, Ajaib S.: *See*—
Berard, Paul M.; and Bhadare, Ajaib S., 4,959,836, Cl. 371-69.100.

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Bhuri, Gurcharan S., to AT&T Bell Laboratories. End-to-end network surveillance. 4,959,849, Cl. 379-32.000.

Biernat, Jan F.: *See*—
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.

Bigelow, Richard S. Center punch block device. 4,958,441, Cl. 33-670.000.

Biglione, Gianfranco; and Matarrese, Savino, to Montedison S.p.A. Modified impact-resistant vinylaromatic copolymers. 4,959,434, Cl. 526-342.000.

Billinger, Otto: *See*—
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.

Billingsley, John G. S., to Precision Cutters, Inc. Materials handling fan impeller. 4,958,987, Cl. 416-213.00A.

Billman, Elizabeth R.: *See*—
Mehrotra, Pankaj K.; and Billman, Elizabeth R., 4,959,331, Cl. 501-89.000.
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Bink, Paul; and Blanie, Paul. Universal vision corrector. 4,958,922, Cl. 351-46.000.

Binnall, Daniel G.: *See*—
Tulpule, Bhalchandra R.; and Binnall, Daniel G., 4,959,782, Cl. 364-200.000.

Binnig, Fritz: *See*—
Lubisch, Wilfried; Binnig, Fritz; and von Philipsborn, Gerda, 4,959,373, Cl. 514-300.000.

Bio-Rad Laboratories, Inc.: *See*—
Parekh, Bharat S.; Link, William F.; and Coates, Stephen R., 4,959,197, Cl. 422-101.000.

Bio-Support Industries Ltd.: *See*—
Roberts, Frank L., 4,958,635, Cl. 128-403.000.

Biofor, Ltd.: *See*—
Lee, Sung J., 4,959,482, Cl. 548-543.000.

Biomet, Inc.: *See*—
Brown, David R.; and Martin, Jeff L., 4,959,071, Cl. 623-20.000.

Biovallee: *See*—
Moisson, Claude, 4,959,196, Cl. 422-68.050.

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Bisher, Dwight S. Security stop. 4,958,869, Cl. 292-339.000.

Bishop, Robert G.: *See*—
Diehl, Rodney A.; Uhrman, Robert L., Jr.; Bishop, Robert G.; and Campbell, Donald B., 4,958,537, Cl. 74-606.00R.

Bitstream Inc.: *See*—
Apley, Philip G.; Berlow, David A.; and Collins, John S., 4,959,801, Cl. 364-518.000.

Bjorke, Merlin D.; and Thue, Baard H., to Honeywell Inc. Digitally generated two carrier phase coded signal source. 4,959,654, Cl. 342-120.000.

Blakeburn, Dave L., II; Fu, Ta-Wei; and Roussel, Keith M., to Conoco Inc. Binder pitch and method of preparation. 4,959,139, Cl. 208-39.000.

Blakeney, Andrew J.; Sarubbi, Thomas; and Sizensky, Joseph J., to Olin Hunt Specialty Products Inc. Light-sensitive o-quinone diazide composition and product with phenolic novolak prepared by condensation with haloacetoaldehyde. 4,959,292, Cl. 430-165.000.

Bland, Gerald F.; Freitag, Michael W.; and Mondek, Martin J., to Outboard Marine Corporation. Marine propulsion device cover arrangement. 4,959,033, Cl. 440-76.000.

Blandino, Thomas; and Starr, Ruth L., to Criticare Systems, Inc. Vital signs monitor pumping system. 4,958,636, Cl. 128-630.000.

Blanie, Paul: *See*—
Binh, Paul; and Blanie, Paul, 4,958,922, Cl. 351-46.000.

Bliss, Jonathan G.: *See*—
Weaver, James C.; Bliss, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail L, 4,959,301, Cl. 435-5.000.

Blohm + Voss AG: *See*—
Langenberg, Hans; and Wessel, Jurgen, 4,959,032, Cl. 440-66.000.

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Wells, Paul J.; and Bloor, David, 4,958,895, Cl. 350-96.120.

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Board of Governors of Wayne State University: *See*—
Schaap, Arthur P., 4,959,182, Cl. 252-700.000.

Board of Regents, The University of Texas System: *See*—
Ogden, Daryl M., 4,959,308, Cl. 435-7.000.

Boardman, Charles E.: *See*—
Hunsbedt, Anstein; and Boardman, Charles E., 4,959,193, Cl. 376-299.000.

Bobo, Donald E., Jr., to Baxter International Inc. In-line infiltration detection apparatus and method. 4,959,050, Cl. 604-49.000.

BOC Group plc, The: *See*—
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Boehlke, Klaus: *See*—
Taubitz, Christof; Seiler, Erhard; Hambrecht, Juergen; Mitulla, Konrad; and Boehlke, Klaus, 4,959,415, Cl. 525-133.000.

Boehringer Mannheim Corporation: *See*—
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Boeing Company, The: *See*—
Brewer, Richard A., 4,958,794, Cl. 248-183.000.

Bogart, Bruce E.: *See*—
Wallick, Claude R., Jr.; Schmitt, Thomas J.; Bogart, Bruce E.; and Kreba, John L., 4,959,107, Cl. 148-13.000.

Boge AG: *See*—
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Boling, Edward J.: *See*—
Colquitt, Leroy, Jr.; Sutherland, Fred R.; and Boling, Edward J., 4,959,701, Cl. 357-24.000.

Bolle, Joachim, to Schubert & Salzer Maschinenfabrik Aktiengesellschaft. Full mold casting process and device. 4,958,674, Cl. 164-456.000.

Bomer, Bruno: *See*—
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Piechtschan, Alfred, 4,959,419, Cl. 525-301.000.

Bonifer, Edgar; Duttine, Walter; and Reckemeier, Hartwig, to Mannesmann AG. Roller track. 4,958,723, Cl. 198-781.000.

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Bonner, Guy, Jr.: *See*—
Woods, Richard E.; Bonner, Guy, Jr.; Smyth, Jerry S.; and Felton, Roger D., 4,959,637, Cl. 340-573.000.

Bonner, Timothy; and Curthoys, John R. C. Flow meter. 4,958,524, Cl. 73-861.180.

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Brichta, Corrado; Vezzoli, Annibale; and Borghi, Angelo, 4,959,397, Cl. 521-96.000.

Bosse, Mark: *See*—
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Bates, James S.; Clement, Thomas P.; and White, Darrell W., 4,958,625, Cl. 128-754.000.

Bourns Instruments, Inc.: *See*—
Trommler, Craig S.; and Finefrock, Mark D., 4,958,520, Cl. 73-727.000.

Bourquin, Al W. J.: *See*—
Nelson, Michael J. K.; Bourquin, Al W. J.; and Pritchard, Parmely H., 4,959,315, Cl. 435-167.000.

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Bowling, Donald R.; and Smith, Charles F., to United States of America, Navy. Apparatus for determining microwave characteristics of superconductive materials using a resonant cavity and calibration waveguides. 4,959,614, Cl. 324-636.000.

Bowne, Arlyce T.: *See*—
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,959,480, Cl. 548-262.400.

Boyd, David W., to Hewlett-Packard Company. Method for determining aperture shape. 4,959,541, Cl. 250-237.00R.

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BP Chemicals Limited: *See—*
Umpleby, Jeffrey D., 4,959,413, Cl. 525-100.000.
Van Ooyen, Johannes A. C., 4,959,223, Cl. 426-2.000.

Brade, Wolfgang P.: *See—*
Sauerbier, Dieter; Isaac, Otto; and Brade, Wolfgang P., 4,959,215, Cl. 424-422.000.

Bradley, William D.: *See—*
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Briggs, Paul C.; and Gosiewski, Donald E., to Illinois Tool Works, Inc. Acid modified adhesive composition. 4,959,405, Cl. 524-321.000.

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Carey, Martin C.; Moses, Alan C.; and Flier, Jeffrey S., 4,959,358, Cl. 514-171.000.

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Smith, David W., 4,959,826, Cl. 370-1.000.
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Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.
Yamamoto, Takemi; Komiya, Ryohei; Hatta, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiro, 4,959,682, Cl. 355-27.000.

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Helms, Israel F., 4,958,437, Cl. 33-503.000.

Bruce, Robert A.: *See—*
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Brunner, Maureen; and Palefsky, Howard, to Collagen Corporation. Composition and method for treatment of dermal inflammation. 4,959,205, Cl. 424-59.000.

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Budert, Gunter H.: *See—*
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Lea, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoog, Ivan H., 4,959,294, Cl. 430-204.000.
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Busboom, Garry W., to Exmark Manufacturing Company Incorporated. Vegetation cutting blades assembly. 4,958,484, Cl. 56-255.000.
Busch, Peter; and Thiele, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Applicator for continuous application of hair dye. 4,958,647, Cl. 132-119.100.
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Buss, Rick A.: *See*—
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Butler, Thomas L.; and Stellar, Albert. Golf club and golf ball cleaning device. 4,958,396, Cl. 15-21.200.
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Liscomb, Cristina; and Buzzelli, Anthony J., 4,958,999, Cl. 425-110.000.
Byrne, Norman R. Pivotable power feed connector. 4,959,021, Cl. 439-310.000.
C. Compagnie de Raffinage et de Distribution: *See*—
Mauleon, Jean-Louis; and Sigaud, Jean-Bernard, 4,959,334, Cl. 502-43.000.
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Cadell, Theodore E.; and Rabalais, Kevin, to CME Telemetrix Inc. Multi-channel digital medical telemetry system. 4,958,645, Cl. 128-903.000.
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Calcerano, Victor A., to Duracell Inc. Battery package. 4,958,731, Cl. 206-333.000.
Caldwell, James D., Jr., to Skeeter Products, Inc. Boat hull. 4,958,585, Cl. 114-271.000.
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Campbell, Henry F.: *See*—
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Canada, Her Majesty the Queen in Right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government: *See*—
Martel, Yvan, 4,958,572, Cl. 102-529.000.
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Jain, Praveen K., 4,959,766, Cl. 363-48.000.
Cannady, Charles L. Combination reclining headboard and table for a bed. 4,958,392, Cl. 5-507.000.
Cannon, Fleming V., Jr.: *See*—
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Nishikawa, Tatsuo, 4,959,740, Cl. 360-106.000.
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Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.
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Koitabashi, Noribumi, 4,959,688, Cl. 355-219.000.
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
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Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
Sasaki, Takashi; Sakurada, Nobuaki; and Kawamura, Hideaki, 4,959,659, Cl. 346-1.100.
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Carey, Martin C.; Moses, Alan C.; and Flier, Jeffrey S., to Beth Israel Hospital Assn.; and Brigham and Womens Hospital, Inc., The. Drug administration. 4,959,358, Cl. 514-171.000.
Careyote, Nicholas J.: *See*—
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Carlson, Michael G., to Western Forms, Inc. Locking hinge mechanism. 4,958,800, Cl. 249-219.100.
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Carrington Laboratories Inc.: *See*—
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Chaen, Shigehiro: *See*—
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Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., to PPG Industries, Inc. Active agent delivery device. 4,959,208, Cl. 424-78.000.

Champagne, Phillip A. Locking device for washers and dryers. 4,958,867, Cl. 292-259.00R.

Champane, Dean J. Motor vehicle sunshield. 4,958,880, Cl. 296-97.700.

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Chan, Mary K.; and Osaka, Victor. Data recorder. 4,958,454, Cl. 40-495.000.

Chan, Norman C.: *See*—
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Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., to Midmark Corporation. Stirrup assembly for examination table. 4,958,816, Cl. 269-328.000.

Chang, Morgan. Convertible toy kit. 4,958,842, Cl. 280-7.100.

Chang, Siew H., to Du Pont de Nemours, E. I., and Company. Herbicidal O-carbomethoxysulfonylurea. 4,959,095, Cl. 71-93.000.

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Chapdelaine, Albert H.; Kures, Vasek J.; and Grey, Ronald T., to Wm. Wrigley Jr. Company. Method of optimizing texture and processability of chewing gums and compositions made therefrom. 4,959,226, Cl. 426-3.000.

Chapin, David S.: *See*—
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Chappell, Gilmore H. Automatic fluid valve. 4,958,803, Cl. 251-342.000.

Charles, Richard J.; and Gaddipati, Achuta R., to General Electric Company. Zinc oxide varistor structure. 4,959,262, Cl. 428-329.000.

Charondiere, Georges. Expandable connector to axially join tubular devices. 4,958,953, Cl. 403-297.000.

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Chattha, Mohinder S.: *See*—
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Lehmann, Klaus; Domsch, Andreas; and Hawel, Hans, 4,959,123, Cl. 162-5.000.

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Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.
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Brown, Gregory L.; Eiferman, Richard; Schultz, Gregory L.; and Valenzuela, Pablo D. T., 4,959,353, Cl. 514-12.000.

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Inaba, Shin-ichi; and Nagahama, Hideki, 4,959,200, Cl. 423-347.000.
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Aulik, David J.; and Christensen, Robert E., 4,959,240, Cl. 426-637.000.

Christian, Jeffrey J.; and Nassi, Menahem, to Cardiometrics, Inc. Guide wire assembly with electrical functions and male and female connectors for use therewith. 4,958,642, Cl. 128-772.000.

Christman, Judith K.: *See*—
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Ellis, Frank B., Jr.; Delahdy, Alan E.; Allen, Jonathan; and Volltrauer, Hermann, 4,959,112, Cl. 156-248.000.

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Clauw, Mitchell J.; Stupera, Neal G.; Tobin, Theodore W.; and Viscome, Dennis M., 4,958,799, Cl. 248-430.000.
Glowczewski, Thomas; Carle, Keith B.; and Lindsay, Michael R., 4,959,786, Cl. 364-424.100.
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, 4,959,043, Cl. 475-230.000.
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Rossi, Cristiano, 4,959,522, Cl. 219-121.750.
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Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.

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Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.

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Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, 4,959,455, Cl. 530-351.000.

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Baschang, Gerhard; and Sallman, Alfred, 4,959,394, Cl. 514-555.000.
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Frei, Bruno; Mereyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.
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Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.

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Clark, William T., III. Method and apparatus for specific affinity enhanced transport bioreactor. 4,959,148, Cl. 210-635.000.
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Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,959,480, Cl. 548-262.400.
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Clauw, Mitchell J.; Stupera, Neal G.; Tobin, Theodore W.; and Viscome, Dennis M., to Chrysler Corporation. Seat track latch anti-rattle release wire. 4,958,799, Cl. 248-430.000.
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Clement, Heinz, to Rieter Machine Works, Ltd. Drive mechanism for a feed roll of a combing machine. 4,958,413, Cl. 19-115.00R.
Clement, Thomas P.: *See*—
Bates, James S.; Clement, Thomas P.; and White, Darrell W., 4,958,625, Cl. 128-754.000.
Clemson University: *See*—
Heimke, Gunther; von Recum, Andreas F.; and Shanbhag, Arun, 4,959,054, Cl. 604-175.000.
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Cadell, Theodore E.; and Rabalais, Kevin, 4,958,645, Cl. 128-903.000.
Cnyrim, Henner; and Felsen, Peter, to Wabco Westinghouse Fahrzeugbremsen GmbH. Printed circuit board for carrying a mixed-component assembly. 4,959,750, Cl. 361-401.000.
Coates, Stephen R.: *See*—
Parekh, Bharat S.; Link, William F.; and Coates, Stephen R., 4,959,197, Cl. 422-101.000.
Cobb, Gary S.; and Thomas, Phillip M., to AT&T Bell Laboratories. Splice closure. 4,958,903, Cl. 350-96.200.
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Forney, G. David, Jr., 4,959,842, Cl. 375-39.000.
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Colbert, Robert E. Golf club assembly. 4,958,834, Cl. 273-77.00A.
Cole, Jack H., to Conoco Inc. Apparatus for generating elliptically polarized shear waves. 4,959,818, Cl. 367-189.000.
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Curtis, John P.; and Kemp, James H., 4,958,751, Cl. 222-192.000.
Collagen Corporation: *See*—
Brunner, Maureen; and Palefsky, Howard, 4,959,205, Cl. 424-59.000.
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Nadland, Karl J.; and Kleppe, Mari A., 4,959,222, Cl. 424-692.000.
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Collins, Terence W., to Pilkington plc. Printing screen and method of printing a non-absorbent substrate. 4,958,560, Cl. 101-128.210.
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Cominco Ltd.: *See*—
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Commonwealth Scientific and Industrial Research Organisation: *See*—
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Compaq Computer Corporation: *See*—
Miller, Joseph P., 4,959,557, Cl. 307-265.000.
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Computer Products, Inc.: *See*—
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Congoleum Corporation: *See*—
Toal, Hugh F.; Careyote, Nicholas J.; and Sapienza, Michael A., 4,958,399, Cl. 15-104.00S.
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Blakeburn, Dave L., II; Fu, Ta-Wei; and Roussel, Keith M., 4,959,139, Cl. 208-39.000.
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Grimsley, R. Leroy, 4,959,165, Cl. 252-8.551.
Continental Sprayers, Inc.: *See*—
Dennis, Stephen R., 4,958,754, Cl. 222-383.000.
Conway, Gerald. Cotton basket unloading regulator. 4,958,756, Cl. 222-164.000.
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, to May & Baker Limited. Thioformamide derivatives. 4,959,385, Cl. 514-431.000.
Cook, Ronald L.; and Sammells, Anthony F., to Gas Research Institute. Gas phase CO_2 reduction to hydrocarbons at solid polymer electrolyte cells. 4,959,131, Cl. 204-59.00R.
Cooke, Richard D.; and Higginbottom, Charles, to Automotive Products plc. Adjusting device for a twin-plate clutch. 4,958,714, Cl. 192-111.00A.
Coombes, Steven A.: *See*—
Stirling, Robert; and Coombes, Steven A., 4,959,525, Cl. 219-291.000.
Coombs, Dennis W., to Neurodelivery Technology, Inc. Method for making a multi-lumen epidural-spinal needle and tip and stock configuration for the same. 4,958,901, Cl. 604-44.000.
Cooper Industries, Inc.: *See*—
Grubbs, Jeffrey W.; and Chapin, David S., 4,958,435, Cl. 30-248.000.
Kurz, Jurgen, 4,958,401, Cl. 15-104.160.
Cooper, James L.; and San Soucie, Marc D., to Wang Laboratories, Inc. Structures and methods for representing and processing documents. 4,959,769, Cl. 364-200.000.
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Anderson, Vincent P.; and Cordill, Rexford W., 4,958,890, Cl. 312-214.000.
Corey, John A., to Mechanical Technology Incorporated. Multi-bottle, no compressor, mean pressure control system for a Stirling engine. 4,958,496, Cl. 60-521.000.
Cornaby, Andrew J.; and Dempsey, Roy A., to Endogen, Inc. Method of evaluating immune system response to allografts, viral infection and immunosuppressive therapy. 4,959,302, Cl. 435-5.000.
Corns, Ronald R.: *See*—
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Corporation of the President of the Church of Jesus Christ of Latter-Day Saints: *See*—
Austin, Lawrence C., 4,959,828, Cl. 370-4.000.
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Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
Council of Scientific & Industrial Research: *See*—
Khan, M. M. Taqui; and Siddiqui, M. R. Hussain, 4,959,335, Cl. 502-62.000.
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Covington, John B.: *See*—
Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., 4,959,293, Cl. 430-189.000.
Cox, Brian J.: *See*—
Rosenbluth, Robert F.; and Cox, Brian J., 4,958,630, Cl. 128-79.000.
Cox, Kirsten, to Wiegner, Georg. Applicator for dispensing active substances. 4,959,052, Cl. 604-77.000.
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., to Exxon Research and Engineering Co. Narrow MWD alpha-olefin copolymers. 4,959,436, Cl. 526-348.000.

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Wright, Robert L., 4,958,729, Cl. 206-315.100.

Crews, Phillip; Matthews, Thomas R.; and Inman, Wayne D. Alkaloids of marine origin. 4,959,370, Cl. 514-280.000.

Critelli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, to Dialight Corporation. Surface mounted led package. 4,959,761, Cl. 362-226.000.

Criticare Systems, Inc.: *See*—
Blandino, Thomas; and Starr, Ruth L., 4,958,636, Cl. 128-630.000.

Cross, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., to Pfizer Inc. Anti-arrhythmic agents. 4,959,366, Cl. 514-239.500.

Cross, Rex D. Locking pivot shoe. 4,958,462, Cl. 49-181.000.

Crothers, Donald M.: *See*—
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Johnson, Calvin S., 4,958,670, Cl. 144-34.00R.

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Cur, Omer N.: *See*—
Kruck, Richard W.; and Cur, Omer N., 4,959,111, Cl. 156-145.000.

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Brothers, James L., 4,958,498, Cl. 62-51.100.

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Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 4,959,840, Cl. 372-57.000.

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Dahn, Jeffery R.; and Way, Brian M., to Moli Energy Limited. Cathode active materials, methods of making same and electrochemical cells incorporating the same. 4,959,282, Cl. 429-224.000.

Daido Metal Company, Ltd.: *See*—
Mori, Sanae; Sakamoto, Masaaki; Yamamoto, Koichi; and Sakai, Kenji, 4,959,274, Cl. 428-555.000.

Daigle, Joseph, to Alternative Industrial Devices for Safety, Inc. Wireless power controller for a machine device. 4,959,647, Cl. 340-825.720.

Daiben Corporation: *See*—
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Daimler-Benz AG: *See*—
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Leiber, Heinz; Klinker, Walter; and Meier, Gerhard, 4,958,704, Cl. 188-285.000.

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Dale, Hal J. Walking and skiing aid. 4,958,650, Cl. 135-65.000.

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Podkowa, William J.; and Williams, Clark R., 4,959,646, Cl. 340-825.830.

Dalmine SpA: *See*—
Cappelli, Cataldo; and Morlotti, Norberto, 4,958,862, Cl. 285-334.000.

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Dekker, Jan H.; and Damstra, Ate K., 4,959,556, Cl. 307-261.000.

Danek, Michael J., to General Motors Corporation. Multiple fill level vehicle fuel system. 4,958,655, Cl. 137-80.000.

Danieli & C. Officine Meccaniche S.p.A.: *See*—
Mancini, Flavio, 4,958,573, Cl. 104-2.000.

Dankowski, Manfred, to Degussa Aktiengesellschaft. Process for the production of water insoluble peroxycarboxylic acids. 4,959,497, Cl. 562-006.000.

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Darbee, Paul V.; Ellis, Richard E.; Jansky, Louis S.; and Grossman, Avram S., to Universal Electronics, Inc. Universal remote control device. 4,959,810, Cl. 364-900.000.

Darby, Ted A.: *See*—
Bugni, Anthony R.; Phillips, Larry G.; Darby, Ted A.; Naimpally, Saiprasad V.; and Burdick, William S., 4,959,716, Cl. 358-139.000.

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Brinkmeyer, Ernst; Fuchs, Manfred; Brennecke, Wolfgang; and Dargatz, Wilhelm, 4,958,896, Cl. 350-96.130.

Darkanbaeva, Galina T., administrator: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beriashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

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Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, to BASF Aktiengesellschaft. Novel strobilurine derivatives, their preparation and their use. 4,959,484, Cl. 549-334.000.

Daunter, Brian, to University of Queensland. Contraceptive methods and delivery systems thereof. 4,959,216, Cl. 424-430.000.

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Davenport, C. Brent: *See*—
Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.

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Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.
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Davis, Burns, deceased; and Walker, Theodore R., Jr., 4,959,446, Cl. 528-185.000.

Davis, Burns, deceased (by Davis, Bessie Anne, executrix); and Walker, Theodore R., Jr., to Eastman Kodak Company. Polyamide with improved gas barrier properties from cyclo-alkylidene bisphenoxy diacetic acid. 4,959,446, Cl. 528-185.000.

Davis, Curtis E. Impact tool handle. 4,958,540, Cl. 81-20.000.

Davis, Dale G. Computer screen magnifier. 4,958,907, Cl. 350-243.000.

Davis, John E., to Ampex Corporation. Shadow memory system for storing variable backup blocks in consecutive time periods. 4,959,774, Cl. 364-200.000.

Davis, Larry: *See*—
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.

Davis S. Mark: *See*—
Cody, Ian A.; Hamner, deceased Glen P.; Sawyer, Willard H.; Sawyer, Willard H.; and Davis S. Mark, 4,959,337, Cl. 502-230.000.

Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., to Polystr Limited. Chlorinated EPDM with superior stability. 4,959,420, Cl. 525-331.700.

Dayco Products, Inc.: *See*—
Lewis, Charles M.; and Pourahmady, Nasser, 4,959,444, Cl. 528-170.000.

Deardurff, Larrie A.: *See*—
Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.

Death, David L.: *See*—
Haub, John G.; Eberhardt, John E.; and Death, David L., 4,959,549, Cl. 250-461.100.

DeBaun, Carleton: *See*—
Critelli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, 4,959,761, Cl. 362-226.000.

De Castro, Emory S.: *See*—
Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.

Deere & Company: *See*—
Swartzendruber, James A., 4,958,535, Cl. 74-481.000.

Deerfield, Alan J.; and Siu, Sun-Chi, to Raytheon Company. Method and apparatus for addressing a memory by array transformations. 4,959,776, Cl. 364-200.000.

Degen, Peter J., to Pall Corporation. Fluid treatment system having low affinity for proteinaceous materials. 4,959,150, Cl. 210-638.000.

De Giorgi, Marco: *See*—
Re, Alberto; and De Giorgi, Marco, 4,959,426, Cl. 525-527.000.

Degussa Akteingesellschaft: *See*—
Dankowski, Manfred, 4,959,497, Cl. 562-006.000.
Degussa Aktieagesellschaft: *See*—
Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, 4,959,478, Cl. 546-319.000.
Dehennau, Claude, to Solvay & Cie (Societe Anonyme). Structures with multiple polymeric layers comprising a layer of vinyli-dene fluoride polymer bonded to a layer of plasticized vinyl chloride polymer and use of these structures for the manufacture of flexible packaging. 4,959,269, Cl. 428-421.000.
Dehn, Freddie H. Method and device for aligning vehicle frame. 4,958,439, Cl. 33-608.000.
Dekker, Jan H.; and Damstra, Ate K., to U.S. Philips Corporation. Circuit arrangement for deriving a direct voltage from the mains alternating voltage. 4,959,556, Cl. 307-261.000.
Delacroix, Eugene; Fargeas, Jean-Marc; and Imbeaux, Jean-Claude, to ETAT FRANCAIS, repreesente par la Ministre des Postes, Telecommunications et de l'Espace (Centre National d'Etudes des Telecommunications). Digital transmission demodulator including an automatic fault corrector. 4,959,619, Cl. 329-306.000.
Delahdy, Alan E.: *See*—
Ellis, Frank B., Jr.; Delahdy, Alan E.; Allen, Jonathan; and Volltrauer, Hermann, 4,959,112, Cl. 156-248.000.
Delaware Capital Formation, Inc.: *See*—
Dykstra, Henry, 4,958,813, Cl. 269-32.000.
Delco Electronics Corporation: *See*—
Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palaniasamy, Ponnusamy, 4,959,751, Cl. 361-406.000.
Henderson, Mark F.; and Manderfield, Thomas H., 4,959,708, Cl. 357-84.000.
Kearney, Mark B., 4,959,622, Cl. 330-257.000.
Kohler, James L., 4,959,759, Cl. 362-80.000.
Manlove, Gregory J.; Marrah, Jeffrey J.; and Kennedy, Richard A., 4,959,859, Cl. 381-10.000.
De Leonibus, Vittore; and Pascale, Carmine, to Societa Italiana Vetro - SIV S.p.A. Apparatus for the pressing of laminated glass/plastic composites. 4,959,117, Cl. 156-497.000.
Del Monte, Philip J.; and Vanwey, Jackie L. Frequency responsive selective ringing circuit. 4,959,853, Cl. 379-180.000.
Delong, Christian P.: *See*—
Rasinski, John E.; and Delong, Christian P., 4,959,015, Cl. 434-2.000.
Delvaux, Andre L.: *See*—
Van Camp, Maurits C.; Wattel, Philippe M.; and Delvaux, Andre L., 4,959,085, Cl. 55-72.000.
Demaio, Richard; and Piera, James. Roll-up lap tray. 4,958,577, Cl. 108-43.000.
Demarinis, Robert M.: *See*—
Lafferty, John J.; Demarinis, Robert M.; and Venslavsky, Joseph W., 4,959,360, Cl. 514-217.000.
Demets, Laurent H. T.: *See*—
Claessens, Stephanus J.; and Demets, Laurent H. T., 4,959,586, Cl. 313-273.000.
Dempo, Fumio, to Fukuda, Aoi; and Suzuki, Kiyoko. Water treating apparatus. 4,959,142, Cl. 210-167.000.
Dempsey, Roy A.: *See*—
Cornaby, Andrew J.; and Dempsey, Roy A., 4,959,302, Cl. 435-5.000.
Dengen Co., Ltd.: *See*—
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,301, Cl. 62-125.000.
Denham, Keith; Savage, Donald S.; and Shortland, John A., to Avdel Systems Limited. Fastener installation apparatus. 4,958,510, Cl. 72-391.400.
Denison, Ian. Sailboard apparatus. 4,958,581, Cl. 114-93.000.
Denison, John M.: *See*—
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.
Dennis, Stephen R., to Continental Sprayers, Inc. Dispenser or sprayer with vent system. 4,958,754, Cl. 222-383.000.
Dennison Manufacturing Company: *See*—
Tighe, Laurence E.; and Parker, Tim, 4,959,516, Cl. 219-10.55F.
Denzinger, Walter: *See*—
Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlsender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.
Depcik, Hans-Werner: *See*—
Foltin, Eckard; Depcik, Hans-Werner; Huff, Karl; Pischtschan, Alfred; Yesildag, Mehmet C.; and Erkelenz, Reiner, 4,959,406, Cl. 524-413.000.
de Rudnay, Andre. Apparatus and evaporator for metallizing foils. 4,959,524, Cl. 219-275.000.
Detection Systems Pty. Ltd.: *See*—
Maher, Anthony J., 4,959,636, Cl. 340-568.000.
Deutsche ITT Industries GmbH: *See*—
Micic, Ljubomir; and Flamm, Peter M., 4,959,721, Cl. 358-194.100.
Deutsche Thomson-Brandt GmbH: *See*—
Morimoto, Yasuaki; and Zucker, Friedhelm, 4,959,821, Cl. 369-13.000.
Deutsche Voest-Alpine Industrieanlagenbau GmbH: *See*—
Hauk, Rolf, 4,958,808, Cl. 266-154.000.
Devanlay: *See*—
Allaire, Jacky; and Kozlowskyj, Wasil, 4,958,507, Cl. 66-19.000.
DeVries, Robert C.: *See*—
Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., 4,958,592, Cl. 118-724.000.
De Weers, Antonius M. Sewing device for mattresses or cushions. 4,958,579, Cl. 112-2.100.
Dexter Systems, Inc.: *See*—
Spallone, John J.; Doyle, William E.; and Cawley, Peter, 4,959,686, Cl. 364-401.000.
Dhein, Rolf: *See*—
Meyer, Rolf-Volker; Dhein, Rolf; Wandel, Martin; Selbeck, Harald; Fahnler, Friedrich; Heinz, Hans-Detlef; and Muller, Peter-Rolf, 4,959,452, Cl. 528-328.000.
Diaco, Joseph; and Kennedy, Todd R. Vehicle cargo bed liner. 4,958,876, Cl. 296-39.200.
Dialight Corporation: *See*—
Critelli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, 4,959,761, Cl. 362-226.000.
Dickinson, James M.: *See*—
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 4,959,194, Cl. 419-46.000.
Diehl, Rodney A.; Uhrman, Robert L., Jr.; Bishop, Robert G.; and Campbell, Donald B., to Saturn Corporation. Transmission casing cover with tubular conduit cast in situ. 4,958,537, Cl. 74-606.00R.
Diesel KIKI Co., Ltd.: *See*—
Ueno, Katsumi, 4,958,553, Cl. 91-447.000.
Dietrich, Michael: *See*—
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 4,959,430, Cl. 526-257.000.
Digby, Dennis; and Homayoun, Habib, to Instromedix, Inc. Heart data monitoring method and apparatus. 4,958,641, Cl. 128-702.000.
Digital Equipment Corporation: *See*—
Samarov, Victor M.; Doumani, George A., Jr.; and Becker, Philip F., 4,959,752, Cl. 361-424.000.
DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., to Pitney Bowes Inc. Microprocessor system controller for mail processing system applications. 4,959,600, Cl. 318-625.000.
Dijkema, Reinder; and Kos, Antonides, to Nederlandse Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek. Desoxyribonucleic acid; microorganisms; diagnostic agent for delta infection and the use thereof. 4,959,462, Cl. 536-27.000.
Dillman, Norman G., to Hewlett-Packard Company. Apparatus and method for extracting the RMS value from a signal. 4,959,608, Cl. 324-132.000.
Di Nunzio, Vittorio; and Giaccardi, Eraldo, to Fiat Auto S.p.A. Multiple-spark ignition system for internal combustion engines, particularly for motor vehicles. 4,958,616, Cl. 123-535.000.
Di Rosa, Gaetano, to Fata Automation S.p.A. Electrical connector system for automated storage. 4,959,020, Cl. 439-138.000.
Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., to United States of America, Navy. Method of soldering aluminum. 4,958,763, Cl. 228-193.000.
Di Vincenzo, Antonio: *See*—
Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.
Dobran, Flavio, to Dobran, Flavio. Lithium-sulfur hexafluoride magnetohydrodynamic power system configurations and system design considerations. 4,959,566, Cl. 310-11.000.
Dobson, Peter J.; and Neave, James H., to U.S. Philips Corporation. Method of modifying a surface of a body using electromagnetic radiation. 4,959,245, Cl. 427-53.100.
Dr. Ing. h.c.F. Porsche Aktiengesellschaft: *See*—
Kolb, Eugen, 4,958,882, Cl. 296-108.000.
Dodson, James W. Chemiluminescent light element dispensing and activating apparatus. 4,959,756, Cl. 362-34.000.
Doehner, Robert F., Jr., to American Cyanamid Company. Method for the preparation of herbicidal O-carboxyarylimidazolinones. 4,959,476, Cl. 546-167.000.
Dolengowski, Douglas A.: *See*—
Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., 4,958,849, Cl. 280-668.000.
Dollhope, Rudiger; and Naudzik, Bernd, to Rhodia AG. Extrusion process and single-, dual- or multiple-screw extruder. 4,959,186, Cl. 264-102.000.
Domb, Abraham: *See*—
Sanders, Lynda M.; and Domb, Abraham, 4,959,217, Cl. 424-473.000.
Dombrowski, Mitchell; and Welch, Robert, to Wayne State University. Digital dispenser. 4,959,056, Cl. 604-186.000.
Domsch, Andreas: *See*—
Lehmann, Klaus; Domsch, Andreas; and Hawel, Hans, 4,959,123, Cl. 162-5.000.
Domtar Inc.: *See*—
Yalpani, Mansur; and Abdel-Malik, Magdy M., 4,959,461, Cl. 536-18.700.
Donnelly Corporation: *See*—
Moser, Frank H.; and Lynam, Niall R., 4,959,247, Cl. 427-126.500.
Donner, Peter M.: *See*—
Meyer, James M.; Schmidt, David A.; and Donner, Peter M., 4,959,582, Cl. 312-307.000.
Dono, Akira: *See*—
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.

Donohue, Paul C.; Hang, Kenneth W.; and Haun, Michael J., to Du Pont de Nemours, E. I., and Company. Crystallizable glass and thick film compositions thereof. 4,959,330, Cl. 501-8.000.

Donson, Paul: *See*—
White, David A.; and Donson, Paul, 4,959,181, Cl. 252-625.000.

Doraiswamy, Krishna C.: *See*—
Smothers, William K.; Doraiswamy, Krishna C.; Armstrong, Mark L.; and Trout, Torence J., 4,959,283, Cl. 430-1.000.

Doskocil, David. Trench digging or root cutting device. 4,958,457, Cl. 37-94.000.

Doty, Gerald A., to Gateway Industries, Inc. Safety belt with high load indicator. 4,958,853, Cl. 280-801.000.

Doumani, George A., Jr.: *See*—
Samarov, Victor M.; Doumani, George A., Jr.; and Becker, Philip F., 4,959,752, Cl. 361-424.000.

Dow Chemical Company, The: *See*—
Admassu, Wudneh; and Clark, Daniel O., 4,959,082, Cl. 55-16.000.
Couvillion, Mark C., 4,958,527, Cl. 73-863.860.
Harris, Robert F., 4,959,499, Cl. 564-59.000.
Harris, William J.; Lysenko, Zenon; and Hurtig, Carl W., 4,959,492, Cl. 562-453.000.
Karbowski, Robert J., 4,959,157, Cl. 210-752.000.
McCullough, Francis P., Jr.; and Novak, Leo R., 4,959,261, Cl. 428-312.200.
McGraw, Philip W.; Ward, Eldon L.; and Edens, Michael W., 4,959,169, Cl. 252-68.000.
Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., 4,959,473, Cl. 544-263.000.
Seitz, Jerry T.; Berglund, Charles A.; and Paaztor, Andrew J., Jr., 4,959,435, Cl. 526-347.200.
Seitz, Jerry T.; Berglund, Charles A.; and Paaztor, Andrew J., Jr., 4,959,435, Cl. 526-347.200.
Sexton, Diane, 4,959,400, Cl. 523-451.000.
Smith, David A.; Geiger, Herbert B.; and Behr, R. Douglas, 4,959,044, Cl. 493-194.000.
Sun, Yun C., 4,959,271, Cl. 428-476.300.
Sun, Yun C., 4,959,416, Cl. 525-222.000.
Walker, Louis L.; and Larson, Paul A., 4,959,425, Cl. 525-482.000.

Dow Corning Corporation: *See*—
Liscomb, Cristina; and Buzzelli, Anthony J., 4,958,999, Cl. 425-110.000.
Williams, Dwight E., 4,959,340, Cl. 502-401.000.

Dow Corning Kabushiki Kaisha: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.

Dowdall, Dennis S., to Telektron Limited. Pressuring and purging apparatus. 4,958,659, Cl. 137-624.120.

Dowstra, Bart: *See*—
Critelli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, 4,959,761, Cl. 362-226.000.

Doyle, William E.: *See*—
Spallone, John J.; Doyle, William E.; and Cawley, Peter, 4,959,686, Cl. 364-401.000.

Draftex Industries Limited: *See*—
Mathellier, Lionel, 4,959,081, Cl. 49-490.000.

Dresser Industries, Inc.: *See*—
Patel, Ajitkumar G., 4,958,656, Cl. 137-467.000.

Dreyer, Jack A.: *See*—
Schou, Herbert W. D., deceased; and Dreyer, Jack A., 4,959,233, Cl. 426-443.000.

Drosdziok, Armin; Sauer, Harry; and Zoerner, Walter, to Siemens Aktiengesellschaft. Condenser for the water-steam loop of a power plant, in particular a nuclear power plant. 4,958,679, Cl. 165-13.000.

DSP Group, Inc., The: *See*—
Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, 4,959,865, Cl. 381-46.000.

Du, Daoji: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.

Du Pont Canada Inc.: *See*—
Ng, Howard C. H.; and Hunter, Frederick J., 4,959,267, Cl. 428-390.000.

Dubas, Henri, to Ciba-Geigy Corporation. Asymmetric disulfides in lubricant compositions. 4,959,167, Cl. 252-32.70E.

Dube, Ghyslain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., to Alcan International Limited. Recovery of non-ferrous metals from dross. 4,959,100, Cl. 75-10.190.

Duenstl, Josef; Willner, Siegfried; and Schroeppel, Ralph, to Siemens Aktiengesellschaft. Sensor for determining liquid level in a container. 4,958,518, Cl. 73-290.00V.

Duffield, David J.; and Beyers, Billy W., Jr., to RCA Licensing Corporation. Tuner control apparatus having tune-by-label capability. 4,959,720, Cl. 358-191.100.

Dufour, Marcel, to Astea Group, Inc. Papermaking machine and a seamed papermaker's fabric. 4,958,673, Cl. 162-358.000.

Dufour, Pierre, to Salomon S.A. Lace tightening apparatus. 4,958,418, Cl. 24-713.600.

Duggan, Stephen R., to Medtronic, Inc. Adaptable, digital computer controlled cardiac pacemaker. 4,958,632, Cl. 128-419.0PG.

Dumas, Theodore: *See*—
Stancesco, Alexandra; Spiliadis, Apostol; and Dumas, Theodore, 4,959,212, Cl. 424-94.100.

Dumas, William V.; and Foust, Donald F., to General Electric Company. Method for treating a polyimide surface for subsequent plating thereon. 4,959,121, Cl. 156-668.000.

Dunham Tool Co., Inc., The: *See*—
Newton, George; and Parzuchowski, Douglas A., 4,958,543, Cl. 82-124.000.

Dunk, Paul; Hindin, Roger M.; and Miles, Peter J., to Wiggins Teape Group Limited, The. Release paper for making artificial leather. 4,959,264, Cl. 428-331.000.

Dunn, Harold K.; Lazzeri, Mark A.; and Ondria, Jeffrey M., to Zimmer, Inc. Femoral osteotomy guide assembly. 4,959,066, Cl. 606-89.000.

Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., to United States of America, Energy. High strength uranium-tungsten alloy process. 4,959,194, Cl. 419-46.000.

Du Pont de Nemours, E. I., and Company: *See*—
Chang, Siew H., 4,959,095, Cl. 71-93.000.
Donohue, Paul C.; Hang, Kenneth W.; and Haun, Michael J., 4,959,330, Cl. 501-8.000.
Lantzer, Thomas D., 4,959,119, Cl. 156-644.000.
Livnah, Aron, 4,958,888, Cl. 312-140.300.
Mouissie, Bob, 4,959,626, Cl. 333-182.000.
Nebe, William J.; and Osborne, James J., 4,959,295, Cl. 430-281.000.
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,959,390, Cl. 514-522.000.
Robertson, Charles W., Jr., 4,958,930, Cl. 356-357.000.
Rohrbacher, Frank; Spain, Patrick L.; and Fahlsing, Roger A., 4,959,189, Cl. 264-510.000.
Sauer, Brian L., 4,959,317, Cl. 435-172.300.
Smothers, William K.; Doraiswamy, Krishna C.; Armstrong, Mark L.; and Trout, Torence J., 4,959,283, Cl. 430-1.000.
Smothers, William K.; Monroe, Bruce M.; and Chan, Dominic M. T., 4,959,284, Cl. 430-2.000.
Sweeny, Wilfred, 4,959,453, Cl. 528-336.000.
Walker, James B., 4,959,237, Cl. 426-330.500.

DuPree, Tony L. Athletic shoe with break-away high top. 4,958,447, Cl. 36-101.000.

Duracell Inc.: *See*—
Calcerano, Victor A., 4,958,731, Cl. 206-333.000.

Duratron Systems Limited: *See*—
St. Onge, Henri S., 4,958,959, Cl. 405-184.000.

Durcan, D. M.: *See*—
Lee, Ruojia R.; and Durcan, D. M., 4,959,325, Cl. 437-30.000.

Duttine, Walter: *See*—
Bonifer, Edgar; Duttine, Walter; and Reckemeier, Hartwig, 4,958,723, Cl. 198-781.000.

Dyckerhoff & Widmann Aktiengesellschaft: *See*—
Herbst, Thomas; and Jungwirth, Dieter, 4,958,961, Cl. 405-260.000.

Dykstra, Henry, to Delaware Capital Formation, Inc. Die clamp. 4,958,813, Cl. 269-32.000.

Dynabook Technologies Corporation: *See*—
Boyle, Dennis J.; and Sampson, Craig F., 4,958,889, Cl. 312-208.000.

Dzarnoski, John E., Jr.; and Babcock, James W., to Unisys Corporation. Layered electronic assembly having compensation for chips of different thickness and different I/O lead offsets. 4,959,749, Cl. 361-396.000.

E. R. Squibb & Sons, Inc.: *See*—
Hall, Steven E., 4,959,383, Cl. 514-381.000.
Treuner, Uwe D., 4,959,470, Cl. 540-363.000.

Eagle Industry Co., Ltd.: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-152.000.

Ealey, Mark A.; and Lillard, Robert L., to United Technologies Corporation. Magnetodistortive actuator with adjustable magnetic bias. 4,959,567, Cl. 310-26.000.

Early, James W., to United States of America, Energy. Light-driven phase shifter. 4,958,921, Cl. 350-354.000.

Eastman Kodak Company: *See*—
Adcock, Mark W., 4,959,133, Cl. 204-182.800.
Davis, Burns, deceased; and Walker, Theodore R., Jr., 4,959,446, Cl. 528-185.000.
Marino, Philip F., 4,959,531, Cl. 250-201.900.
Morris, John C.; and Jackson, Winston J., Jr., 4,959,450, Cl. 528-272.000.
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,959,480, Cl. 548-262.400.
Tai, Hwai T.; and Ng, Yee S., 4,959,730, Cl. 358-298.000.

Eaton Corporation: *See*—
Gold, Gary L., 4,959,806, Cl. 364-565.000.
Latsko, James M., 4,958,713, Cl. 192-88.00B.
Pipes, George R., 4,958,440, Cl. 33-645.000.
Schutten, Herman P.; Stephenson, Dwight B.; and Haarstad, Donald M., 4,958,493, Cl. 60-384.000.

Eberhard, Walter; and Simmler, Andre , to Feller AG. Electrical apparatus plug. 4,959,025, Cl. 439-622.000.

Eberhardt, John E.: *See*—
Haub, John G.; Eberhardt, John E.; and Death, David L., 4,959,549, Cl. 250-461.100.

Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., to Alza Corporation. Method for delivering somatotropin to an animal. 4,959,218, Cl. 424-473.000.

Eckhardt, Roland, to J. M. Voith GmbH. Measuring device, specifically for measuring the diameter of rolls on roll grinders. 4,958,442, Cl. 33-783.000.

Edens, Michael W.: *See*—
McGraw, Philip W.; Ward, Eldon L.; and Edens, Michael W., 4,959,169, Cl. 252-68.000.
Effendi, Darwin. Filing system. 4,958,728, Cl. 206-44.00B.
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, to Hoechst-Roussel Pharmaceuticals Inc. Phenoxypyridinamine compounds which are use as a dermatological composition. 4,959,377, Cl. 514-349.000.
Effland, Richard C.: *See*—
Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., 4,959,378, Cl. 514-352.000.
Egeland, Byron. Sway bed support frame. 4,958,391, Cl. 5-127.000.
Ehrlich, Rodney P., to Wabash National Corporation. Composite trailer sidewall. 4,958,472, Cl. 52-584.000.
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, to Bayer Aktiengesellschaft. Polymer mixtures having high tensile strength and good tear propagation resistance. 4,959,410, Cl. 525-67.000.
Eichenauer, Herbert: *See*—
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.
Eicken, Karl: *See*—
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Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, 4,959,478, Cl. 546-319.000.
Friedrich, Reinhard: *See*—
Hoppner, Klaus; Friedrich, Reinhard; and Weiss, Hermann, 4,958,602, Cl. 123-195.00C.
Frishling, Dan. Shoulder harness strap adjuster and comfort clip. 4,958,416, Cl. 24-170.000.
Froehler, Brian C.; and Matteucci, Mark D., to Genentech, Inc. Intermediates. 4,959,463, Cl. 536-27.000.
Frokjaer, Sven; Eriksen, Svend; and Adler-Nissen, Jens L., to Novo Industri A/S. Enteral diet product and agent for production thereof. 4,959,350, Cl. 514-2.000.
Frost, John R.: *See*—
Wyss, Clement R.; McGuire, Michael T.; and Frost, John R., 4,959,230, Cl. 426-102.000.
Fu, Ta-Wei: *See*—
Blakeburn, Dave L., II; Fu, Ta-Wei; and Roussel, Keith M., 4,959,139, Cl. 208-39.000.
Fuchs, Harold E.; and McAnany, Robert E., to AT&T Bell Laboratories. Continuous plating method and apparatus. 4,959,129, Cl. 204-28.000.
Fuchs, Manfred: *See*—
Brinkmeyer, Ernst; Fuchs, Manfred; Brennecke, Wolfgang; and Dargatz, Wilhelm, 4,958,896, Cl. 350-96.130.
Fuderer, Andrija. Method of producing nitric acid and refrigeration. 4,959,088, Cl. 62-23.000.
Fuhrmann, Hartmut; and Plaschka, Reinhard, to Man Roland Druckmaschine AG. Method and system for preparing a planographic printing form. 4,958,564, Cl. 101-467.000.
Fuji Electric Co., Ltd.: *See*—
Hongo, Yasuo, 4,959,869, Cl. 382-51.000.
Fuji Jukogyo Kabushiki Kaisha: *See*—
Nakamura, Mitsuo, 4,959,789, Cl. 364-431.050.
Fuji Photo Film Co., Ltd.: *See*—
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.
Arakawa, Satoshi; and Takahashi, Kenji, 4,959,545, Cl. 250-327.200.
Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, 4,959,729, Cl. 358-229.000.
Harada, Toru; and Watanabe, Toshiyuki, 4,959,291, Cl. 430-138.000.
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.
Mitsui, Akio; and Ozawa, Takashi, 4,959,298, Cl. 430-496.000.
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.
Noguchi, Masaru; and Yamamoto, Masafumi, 4,958,893, Cl. 350-6.600.
Otake, Katsumi; Sakamoto, Kiichiro; and Kogane, Mikio, 4,959,683, Cl. 355-28.000.
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokoori, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.
Sato, Akio; and Okada, Kazuo, 4,959,732, Cl. 358-336.000.
Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, 4,959,296, Cl. 430-302.000.
Fuji Xerox Co., Ltd.: *See*—
Nishikawa, Masayuki; and Yagi, Shigeru, 4,959,289, Cl. 430-64.000.
Tsuzuki, Toshiyuki; and Toho, Masato, 4,959,712, Cl. 358-80.000.
Fujibayashi, Kentaro: *See*—
Kawamura, Hideaki; Fujibayashi, Kentaro; and Otsuki, Toshiaki, 4,959,597, Cl. 318-568.150.
Fujie, Naofumi: *See*—
Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 4,959,579, Cl. 310-323.000.
Fujii, Hiroshi; and Katsuki, Shinji, to Sony Corporation. Method and apparatus for driving a stepping motor. 4,959,738, Cl. 360-78.130.
Fujikura, Yoshiaki: *See*—
Ohsuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.
Fujimoto, Nobuyuki: *See*—
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
Fujino, Masaru: *See*—
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, 4,959,333, Cl. 501-136.000.
Fujio, Katuharu, to Matsushita Electric Industrial Co., Ltd. Scroll compressor with thrust support means. 4,958,993, Cl. 418-55.300.
Fujioka, Yasushi: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
Fujisawa Pharmaceutical Co., Ltd.: *See*—
Kamuro, Yasuo; Kakinchi, Toshihito; and Takatsudo, Suguru, 4,959,093, Cl. 71-88.000.

Fujita, Fumio: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.

Fujita, Manabu: *See*—
Ohnuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.

Fujitsu Limited: *See*—
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.

Fukada, Takeshi: *See*—
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.

Fukae, Kensuke, to Kestek Informatio Systems, Inc. Combined electrographic printer, copier, and telefax machine. 4,959,731, Cl. 358-300.000.

Fukazawa, Keiichi: *See*—
Kobayashi, Yousuke; and Fukazawa, Keiichi, 4,958,950, Cl. 400-629.000.

Fukino, Kiyotaka: *See*—
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Fukuda, Aoi: *See*—
Dempo, Fumio, 4,959,142, Cl. 210-167.000.

Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, to Fuji Photo Film Co., Ltd. Video camera having rotatable viewfinder. 4,959,729, Cl. 358-229.000.

Fukubou Teisan Co., Ltd.: *See*—
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.

Fukuoka, Kazuhiko: *See*—
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.

Fukuoka, Tatsuhiko: *See*—
Suganuma, Tatsumi; Norue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.

Fukushima, Akio: *See*—
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitu, 4,959,733, Cl. 358-338.000.

Fukuyama, James M., to General Electric Company. Spiro(bis)indane polyethersulfones and method for their preparation. 4,959,454, Cl. 528-352.000.

Fukuyama, Kazumi: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.

Fukuyama, Masao: *See*—
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Fulton, Janet B.: *See*—
Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 4,959,420, Cl. 525-331.700.

Funahashi, Nobuhiro: *See*—
Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.

Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, to Toa Nenryo Kogyo, K.K. Catalyst component for polymerization of olefins. 4,959,427, Cl. 526-142.000.

Furukawa Electric Co., Ltd., The: *See*—
Tanaka, Yasuzo; Matsumoto, Kaname; and Yamada, Yukio, 4,959,279, Cl. 428-660.000.
Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.

Furusaki, Keizo: *See*—
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, 4,958,514, Cl. 73-25.030.

Furutsuka, Naoyuki: *See*—
Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, 4,959,672, Cl. 354-173.100.

Furuya, Masato: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,959,722, Cl. 358-211.000.

G-C Dental Industrial Corporation: *See*—
Yamamoto, Tameyuki; and Abiru, Masao, 4,959,220, Cl. 424-490.000.

G. D. Searle & Co.: *See*—
Mueller, Richard A.; and Partis, Richard A., 4,959,364, Cl. 514-237.500.

Gabel, Detlef: *See*—
Miura, Michiko; and Gabel, Detlef, 4,959,356, Cl. 514-64.000.

Gabriel, Kathleen B.: *See*—
Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., 4,959,293, Cl. 430-189.000.

Gacon, Jean-Claude: *See*—
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.

Gaddipati, Achuta R.: *See*—
Charles, Richard J.; and Gaddipati, Achuta R., 4,959,262, Cl. 428-329.000.

Gambale, Ronald J.; Hathaway, Susan J.; Longley, Kathryn L.; and Ullman, Timothy J., to General Electric Company. Preparation of copolymer from carboxy-functionalized polycarbonate and nucleophilic polymer. 4,959,411, Cl. 525-67.000.

Gambale, Ronald J.; and Ullman, Timothy J., to General Electric Company. Poly epoxy branched polycarbonate and method for preparation. 4,959,422, Cl. 525-463.000.

Ganz, Matthew W., to Massachusetts Institute of Technology. Adaptive sidelobe blanker. 4,959,653, Cl. 342-17.000.

Garay, Antonio A.; Spaulding, Tedford H.; and Valleau, Robert L., to Switchcraft Inc. Electrical power connector. 4,959,028, Cl. 439-733.000.

Gardner, Deane; and Fellingham, George, to Rastergraphics Inc. Method and apparatus for precisely positioning and stabilizing a continuous belt or web or the like. 4,959,040, Cl. 474-103.000.

Gardner, John G.: *See*—
Bernard, Robin D.; and Gardner, John G., 4,959,144, Cl. 210-232.000.

Garfinkel, Henry. Writing doll. 4,959,037, Cl. 446-299.000.

Garrett, Ian, to British Telecommunication. Optical receiver circuit including a filter network to minimize noise. 4,959,535, Cl. 250-214.00R.

Garrett, Michael E., to BOC Group plc, The. Separation of gas mixtures. 4,959,083, Cl. 55-26.000.

Garrett, Steven L.: *See*—
Hofler, Thomas J.; and Garrett, Steven L., 4,959,539, Cl. 250-227.190.

Garrison, John M. Runoff water trap. 4,958,528, Cl. 73-864.630.

Gas Research Institute: *See*—
Cook, Ronald L.; and Sammells, Anthony F., 4,959,131, Cl. 204-59.00R.
Lee, Douglas W., 4,958,689, Cl. 175-19.000.

Gateway Industries, Inc.: *See*—
Doty, Gerald A., 4,958,853, Cl. 280-801.000.

GEC-Marconi Limited: *See*—
Wells, Paul J.; and Bloor, David, 4,958,895, Cl. 350-96.120.

Geiger, Herbert B.: *See*—
Smith, David A.; Geiger, Herbert B.; and Behr, R. Douglas, 4,959,044, Cl. 493-194.000.

Gell, Michael A., to British Telecommunications public limited company. Semiconductor heterostructures with SiGe material. 4,959,694, Cl. 357-16.000.

Gellman, Barry, to C. R. Bard, Inc. Integrated soft shell reservoir. 4,959,062, Cl. 604-403.000.

Genentech, Inc.: *See*—
Bringman, Timothy S., 4,959,457, Cl. 530-387.000.
Froehler, Brian C.; and Matteucci, Mark D., 4,959,463, Cl. 536-27.000.

General Atomics: *See*—
Goforth, Robert R., 4,958,590, Cl. 118-723.000.

General Electric Company: *See*—
Anderson, John M., 4,959,584, Cl. 313-160000.000.
Anderson, John M.; and Roberts, Victor D., 4,959,592, Cl. 315-248.000.
Anthony, Thomas R.; DeVries, Robert C.; Engler, Richard A.; Ettinger, Robert H.; and Fleischer, James F., 4,958,592, Cl. 118-724.000.
Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., 4,959,583, Cl. 313-113.000.
Axelrod, Robert J.; Jaquins, Donald B. G.; and Tyrell, John A., 4,959,481, Cl. 548-462.000.
Charles, Richard J.; and Gaddipati, Achuta R., 4,959,262, Cl. 428-329.000.
Coryea, Peter F.; and Germer, Warren R., 4,959,607, Cl. 324-103.00R.
Dumas, William V.; and Foust, Donald F., 4,959,121, Cl. 156-668.000.
Fukuyama, James M., 4,959,454, Cl. 528-352.000.
Gambale, Ronald J.; Hathaway, Susan J.; Longley, Kathryn L.; and Ullman, Timothy J., 4,959,411, Cl. 525-67.000.
Gambale, Ronald J.; and Ullman, Timothy J., 4,959,422, Cl. 525-463.000.
Gordon, James F.; Scheidorf, Owen H.; and Scheidorf, Gary O., 4,958,990, Cl. 417-410.000.
Hoegler, Leonard E.; Johnson, Gerald A.; Enock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.
Hunsbedt, Anstein; and Boardman, Charles E., 4,959,193, Cl. 376-299.000.
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.
MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., 4,959,596, Cl. 318-254.000.
Mogro-Campero, Antonio; and Turner, Larry G., 4,959,346, Cl. 505-1.000.
Ortiz, Angel L., Jr., 4,958,900, Cl. 350-96.180.
Penney, Carl M.; and Chande, Tushar S., 4,959,244, Cl. 427-53.100.
Rich, Jonathan D.; Cross, David C.; Burnell, Timothy B.; and Wengrovius, Jeffrey H., 4,959,407, Cl. 524-425.000.
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.
Simmons, John R., 4,958,489, Cl. 60-226.300.
Soileau, Trasimond A., 4,959,762, Cl. 362-376.000.
Yerman, Alexander J.; and Ngo, Khai D., 4,959,630, Cl. 336-83.000.

General Engineering (Netherlands) B.V.: *See*—
Haland, Lars Y., 4,958,854, Cl. 280-806.000.

General Motors Corporation: *See*—
Danek, Michael J., 4,958,655, Cl. 137-80.000.

Filosa, Philip C.; Roeske, Robert G.; and Haydu, Bartley A., 4,959,758, Cl. 362-66.000.
Gold, Thomas P.; Hamberg, James P.; Maness, Darren K.; and Muzechuk, Richard A., 4,958,810, Cl. 267-140.100.
Heimer, Karl-Heinz, 4,958,603, Cl. 123-195.00A.
Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., 4,958,654, Cl. 137-72.000.
Janthur, Ingo, 4,958,600, Cl. 123-41.310.
Kadle, Durgaprasad S., 4,958,681, Cl. 165-151.000.
Kennedy, Lawrence C., 4,958,709, Cl. 192-58.00B.
Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., 4,959,633, Cl. 338-22.00R.
Kirschner, Jochem, 4,958,698, Cl. 180-140.000.
Klomp, Edward D., 4,958,771, Cl. 239-453.000.
Marcus, Leon, 4,958,511, Cl. 73-7.000.
Radomski, Thomas A., 4,959,577, Cl. 310-263.000.
Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., 4,958,773, Cl. 239-584.000.
Stiles, Steven D.; Reinke, Paul E.; and Gomez, Aparicio J., 4,958,516, Cl. 73-118.200.
Taylor, Roland S., 4,958,774, Cl. 239-584.000.
Trombley, Douglas E.; Buslepp, Kenneth J.; Lillie, Cathy C.; and Wancket, Marcel R., 4,958,609, Cl. 123-478.000.
Wilkes, Colin; Mongia, Hukam C.; and Tramm, Peter C., 4,958,488, Cl. 60-39.550.

General Scanning, Inc.: *See*—
Stokes, Brian P., 4,959,568, Cl. 310-51.000.

Genetics Institute, Inc.: *See*—
Clark, Steven C.; Ciarletta, Agnes B.; and Yang, Yu-Chung, 4,959,455, Cl. 530-351.000.

Gentner, Donald R.: *See*—
Strubbe, Hugo J.; and Gentner, Donald R., 4,959,719, Cl. 358-183.000.

Georg Knoblauch, Firma: *See*—
Rau, Georg; and Budert, Gunter H., 4,958,732, Cl. 206-379.000.

Georgia Tech Research Corporation: *See*—
Sharpe, Steven M.; Seals, Joseph; MacDonald, Anita H.; and Crowgey, Scott R., 4,958,638, Cl. 128-653.00R.

Georgiev, Georgy P.: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Gerhart, Paul B., to Honeywell Inc. Apparatus for tracking predetermined data for updating a secondary data base. 4,959,768, Cl. 364-187.000.

Germer, Warren R.: *See*—
Coryea, Peter F.; and Germer, Warren R., 4,959,607, Cl. 324-103.00R.

Gersdorf, Joachim: *See*—
Engelhardt, Friedrich; Riegel, Ulrich; Gersdorf, Joachim; and Kleiner, Hans-Jerg, 4,959,441, Cl. 558-161.000.

Gerstung Enterprises, Inc.: *See*—
Gerstung, William, 4,958,755, Cl. 222-402.230.

Gerstung, William, to Gerstung Enterprises, Inc. Valve for pressurized dispensing cans. 4,958,755, Cl. 222-402.230.

Getreuer, Kurt H.; and Verboom, Johannes J., to Laser Magnetic Storage International Company. Tracking and seeking system for use with an optical record carrier having a wobbled track format. 4,959,823, Cl. 369-44.130.

Giaccardi, Eraldo: *See*—
Di Nunzio, Vittorio; and Giaccardi, Eraldo, 4,958,616, Cl. 123-635.000.

Gillum, Julius H. Auto sun visor. 4,958,879, Cl. 296-97.600.

Giza, John P., to Acushnet Company. Retractable pin mold. 4,959,000, Cl. 425-116.000.

Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., to American Home Products Corporation. Dual chambered oral dosage delivery container. 4,959,051, Cl. 604-77.000.

Glasscock, M. Sidney: *See*—
Turner, James W.; and Glasscock, M. Sidney, 4,958,960, Cl. 405-195.000.

Glaxo Group Limited: *See*—
Lunts, Lawrence H. C.; Skidmore, Ian F.; Finch, Harry; Naylor, Alan; and Campbell, Ian B., 4,959,381, Cl. 514-357.000.
Phillipps, Gordon H.; and Lester, Michael G., 4,959,371, Cl. 514-283.000.

Glotzbach, Joseph: *See*—
Bubley, Henry J.; Glotzbach, Joseph; and Motev, Phil, 4,958,559, Cl. 101-123.000.

Glowczewski, Thomas; Carle, Keith B.; and Lindsay, Michael R., to Chrysler Corporation. Dual regulator for reducing system current during at least one mode of operation. 4,959,786, Cl. 364-424.100.

Goforth, Robert R., to General Atomics. Microwave traveling-wave diamond production device and method. 4,958,590, Cl. 118-723.000.

Gold, Gary L., to Eaton Corporation. Approximated rotational speed signal for shifting transmission. 4,959,806, Cl. 364-565.000.

Gold, Peter N. Vehicle safety bar assembly. 4,958,884, Cl. 296-188.000.

Gold, Thomas P.; Hamberg, James P.; Maness, Darren K.; and Muzechuk, Richard A., to General Motors Corporation. Hydraulic engine mount with domed orifice plate. 4,958,810, Cl. 267-140.100.

Golden Valley Microwave Foods, Inc.: *See*—
Wilson, David, 4,959,120, Cl. 156-651.000.

Goldstein, Gideon: *See*—
Kung, Patrick C.; and Goldstein, Gideon, 4,959,458, Cl. 530-387.000.

Gomes, Anderson S. L.: *See*—
Taylor, James R.; Gomes, Anderson S. L.; and Gouveia-Neto, Artur D., 4,958,910, Cl. 350-321.000.

Gomes, Daniel. Knock-down furniture coupling device. 4,958,425, Cl. 29-433.000.

Gomez, Aparicio J.: *See*—
Stiles, Steven D.; Reinke, Paul E.; and Gomez, Aparicio J., 4,958,516, Cl. 73-118.200.

Gomez, Luis. Method for the purification of fluids such as water, aqueous fluids and fuel fluids. 4,959,155, Cl. 210-687.000.

Gonnelli, Robert R.: *See*—
Gordon, Gary B.; and Gonnelli, Robert R., 4,959,798, Cl. 364-513.000.

Gopwani, Raj K.: *See*—
Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., 4,958,849, Cl. 280-668.000.

Gordon, Gary B.; and Gonnelli, Robert R., to Total Spectrum Manufacturing Inc. Robotic television-camera dolly system. 4,959,798, Cl. 364-513.000.

Gordon, James F.; Scheldorf, Owen H.; and Scheldorf, Gary O., to General Electric Company. Motor-compressor with means to reduce noise. 4,958,990, Cl. 417-410.000.

Gosiewski, Donald E.: *See*—
Briggs, Paul C.; and Gosiewski, Donald E., 4,959,405, Cl. 524-321.000.

Goto, Hitoshi: *See*—
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.

Goto, Nobutaka: *See*—
Kuramatsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.

Gould Inc.: *See*—
Smith, Royston L.; and Rabaza, Maria V., 4,959,772, Cl. 364-200.000.

Gouveia-Neto, Artur D.: *See*—
Taylor, James R.; Gomes, Anderson S. L.; and Gouveia-Neto, Artur D., 4,958,910, Cl. 350-321.000.

Grabbe, Dimitry G., to AMP Incorporated. Electrical contact. 4,959,029, Cl. 439-862.000.

Grabinger, Scott R.: *See*—
Stasz, Peter; Solberg, Jeffrey J.; and Grabinger, Scott R., 4,958,539, Cl. 76-104.100.

Graham, John A.: *See*—
Skrgatic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.

Graham, N. Bruce: *See*—
Lakey, Robert B.; and Graham, N. Bruce, 4,959,231, Cl. 426-111.000.

Grant, Frank O. Poly(methyl methacrylate) blended with a solid poly(-butyl acrylate-co-allyl acrylate) plasticizer. 4,959,408, Cl. 524-523.000.

Grau, Ulrich, to Hoescht Aktiengesellschaft. Crystal suspensions of insulin derivatives, processes for their preparation and their use. 4,959,351, Cl. 514-4.000.

Green Cross Corporation: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.

Greenberg, George. Leaf wagon. 4,958,846, Cl. 280-652.000.

Greenebaume, James E., II, to Pittway Corporation. Ferrule for sealing with a container. 4,958,757, Cl. 222-394.000.

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Greif, Norbert: *See*—
Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.

Greve, Christopher G.: *See*—
Lapeyre, James M.; Weber, Peter G.; and Greve, Christopher G., 4,958,720, Cl. 198-666.000.

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Lloyd, Graham P.; and Mitchell, Dennis R., 4,959,511, Cl. 178-18.000.

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Griese, Klaus; Jona, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, to Robert Bosch GmbH. Gear Machine for a pump or engine having bearing members with circumferential relief grooves. 4,958,994, Cl. 418-132.000.

Griesing, John, to Wang Laboratories, Inc. Dual cable communication system. 4,959,829, Cl. 370-85.300.

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Breeden, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.

Grimsley, R. Leroy, to Conoco Inc. Well completion and servicing fluid. 4,959,165, Cl. 252-8.551.

Grivsky, Eugene M., to Burroughs Wellcome Co. Dialkoxy pyridopyrimidine compounds. 4,959,474, Cl. 544-279.000.

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Grosshauser, Heinrich K.; Kutzner, Willi A. P.; and Schneider, Georg, to Koenig & Bauer Aktiengesellschaft. Inking bar for flush inking unit. 4,958,561, Cl. 101-363.000.
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Darbee, Paul V.; Ellis, Richard E.; Jansky, Louis S.; and Grossman, Avram S., 4,959,810, Cl. 364-900.000.
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Grubbs, Jeffrey W.; and Chapin, David S., to Cooper Industries, Inc. Ripping scissors. 4,958,435, Cl. 30-248.000.
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Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gerriet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seippl, Ulrich G. P., 4,959,391, Cl. 514-546.000.
GTE Products Corporation: *See*—
Barakitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, 4,959,589, Cl. 315-58.000.
Schlitt, Steven C., 4,959,551, Cl. 250-504.00R.
Guenther, Horst: *See*—
David, Marie-Henriette L.; Guenther, Horst; Lemmens, Hilde O. J.; and Roeper, Harald W. W., 4,959,459, Cl. 536-1.100.
Guest, John D. Tube couplings. 4,958,858, Cl. 285-24.000.
Guichard, Pascal, to Alcatel N.V. Cable or wire guide for a guide system. 4,958,783, Cl. 242-157.00R.
Guilbaud, Vincent, to Chantiers Beneteau S.A. Method for the protection against water of a laminated resin wall, and a protected laminated resin wall thus obtained. 4,959,259, Cl. 428-215.000.
Guilhem, Jacques R. J.; and Wengler, Roger L. L. Container for transporting grafts. 4,958,506, Cl. 62-457.200.
Gunnerson, Robert E.; and Bruno, Richard C., to San-Diamond Growers of California. Process for removing pellicle from nut meats. 4,959,236, Cl. 426-288.000.
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Kukes, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., 4,959,140, Cl. 208-59.000.
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Guzik, Nahum; and Rao, Vinod, 4,958,839, Cl. 279-2.00R.
Gynex, Inc.: *See*—
Urheim, John E., 4,958,736, Cl. 206-531.000.
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Haczewski, Joseph J., Jr. Regenerating power unit. 4,959,819, Cl. 368-93.000.
Haefner, Hans-Ulrich; Klotz, Manfred; and Strasser, Wilhelm, to Leybold Aktiengesellschaft. Method and apparatus for checking the operation of a refrigerator-operated cryogenic pump. 4,958,499, Cl. 62-55.500.
Haftmann, Johannes; and Schmeykal, Rudolf, to TA Triumph-Adler Aktiengesellschaft. Drive element for platens of typewriters or similar office machines. 4,958,949, Cl. 400-314.000.
Hagan, Thomas E.; and McGowan, John B., Sr., to Umac Incorporated. Gas supply safety device. 4,958,657, Cl. 137-513.500.
Hagen, Michael P.: *See*—
Cusack, Michael D.; Hagen, Michael P.; and Larkin, James E., 4,959,706, Cl. 357-68.000.
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Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, to Mitsubishi Metal Corporation. Method of manufacturing superconductive coil by explosive compaction. 4,959,344, Cl. 505-1.000.
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Yasumoto, Kazuhiro; and Hagiwara, Ippei, 4,959,571, Cl. 310-67.00R.
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, to Sumitomo Electric Industries, Ltd.; and Honda Motor Co., Ltd. Heat-resistant, wear-resistant and high-strength Al-Si alloy, and cylinder liner employing same. 4,959,276, Cl. 428-614.000.
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, to Zenji Hagiwara; and Kaneko Ltd. Polymer containing amorphous aluminosilicate particles and process for producing the same. 4,959,268, Cl. 428-403.000.
Haland, Lars Y., to General Engineering (Netherlands) B.V. Locking device for a pre-tensioner for a vehicle safety belt. 4,958,854, Cl. 280-806.000.
Hale, Thomas E.: *See*—
Jump, Janeice A.; and Hale, Thomas E., 4,959,517, Cl. 219-10.55R.
Hall, Simon R.; and Wills, Garry D., to Mars GB Ltd. Process for the production of texturized animal protein. 4,959,238, Cl. 426-447.000.
Hall, Steven E., to E. R. Squibb & Sons, Inc. Phenylsulfone alkenoic acids, derivatives thereof, compositions containing same and method of use. 4,959,383, Cl. 514-381.000.
Hall, Thomas L., to Pioneer Manufacturing, Inc. Apparatus for detect missing battery in smoke detector. 4,959,640, Cl. 340-693.000.
Halliburton Company: *See*—
Holtmyer, Marlin D.; and Hunt, Charles V., 4,959,163, Cl. 252-8.551.
Schellhorn, Verne L., 4,958,962, Cl. 405-267.000.
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Horibe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, 4,959,576, Cl. 310-239.000.
Hamada, Kenji: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.
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Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
Hamaguchi, Takehiko: *See*—
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Hamaie, Buji; Ago, Kyoichi; and Hatano, Kazufumi, to Rohm Co., Ltd. Die-bonding method of pellets. 4,958,764, Cl. 228-248.000.
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Hamberg, James P.: *See*—
Gold, Thomas P.; Hamberg, James P.; Maness, Darren K.; and Muzechuk, Richard A., 4,958,810, Cl. 267-140.100.
Hambrecht, Juergen: *See*—
Taubitz, Christof; Seiler, Erhard; Hambrecht, Juergen; Mitulla, Konrad; and Boehlke, Klaus, 4,959,415, Cl. 525-133.000.
Hamilton, Jerry W., to Atco Products, Inc. Tube coupling. 4,958,861, Cl. 285-175.000.
Hammett, Rawlings H. Portable/disposable shower-bath. 4,958,389, Cl. 4-547.000.
Hammond, Dwain H.; Cave, Ellis K.; and Polcyn, Michael J., to Inter-Voice Inc. Apparatus and method for automatically reconfiguring telephone network resources. 4,959,854, Cl. 379-157.000.
Hamner, deceased Glen P.: *See*—
Cody, Ian A.; Hamner, deceased Glen P.; Sawyer, Willard H.; Sawyer, Willard H.; and Davis S. Mark, 4,959,337, Cl. 502-230.000.
Han, Chris M.; Long, Vernal V.; and Silver, Douglas T., to Silver Metal Products, Inc. Elevated post anchor. 4,958,470, Cl. 52-296.000.
Hanabe, Hiroshi: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
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Kuroda, Shigeaki; Ogasi, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
Hancock, John P., to British Alcan Aluminium PLC. Load bearing structural member and frame structure. 4,958,844, Cl. 280-185.000.
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, to Konica Corporation. Color correction device for a color image forming apparatus. 4,959,669, Cl. 346-157.000.
Hang, Kenneth W.: *See*—
Donohue, Paul C.; Hang, Kenneth W.; and Haus, Michael J., 4,959,330, Cl. 501-8.000.
Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, to Kleinewefers GmbH. Apparatus for storing and supplying end closures for envelopes of cylindrical commodities. 4,958,478, Cl. 53-415.000.
Hannersbg, Christer, to AB A.Svensson & Co. Method for draping curtains. 4,958,646, Cl. 160-348.000.
Hanreich, Reinhard G., to Ciba-Geigy Corporation. Process for the preparation of 2-(2-chloroethoxy)-benzenesulfonamide. 4,959,501, Cl. 564-89.000.
Hansen, Craig C.: *See*—
Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., 4,959,779, Cl. 364-200.000.
Hansler, Gerd: *See*—
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Shimomura, Tadao; Harada, Nobuyuki; and Ishizaki, Kunihiko, 4,959,060, Cl. 604-368.000.
Harada, Toru; and Watanabe, Toshiyuki, to Fuji Photo Film Co., Ltd. Light-sensitive material containing silver halide, reducing agent, polymerizable compound and a diazaphthalide dye. 4,959,291, Cl. 430-138.000.
Harder, Ingo: *See*—
Schilling, Bernd; Brink, Gerhard; Harder, Ingo; and Wiest, Hubert, 4,959,249, Cl. 427-387.000.
Harjunpaa, Harri J., to Outokumpu Oy. Method for reducing nitric oxide emissions in exhaust gases from diesel engines. 4,958,490, Cl. 60-274.000.

Harreither, Rupert, to Austria Metall Aktiengesellschaft. Adjusting system for the gap width of support roll pairs in a double-belt press. 4,958,558, Cl. 100-41.000.

Harris Corporation: *See*—
Smith, Terry L.; and Krietzman, William D., 4,958,427, Cl. 27-566.400.

Harris, David A. Bullet assembly and method of making the same. 4,958,570, Cl. 102-517.000.

Harris, James E.; and Winslow, Paul A., to Amoco Corporation. Nucleating agents for poly(aryl ether ketones). 4,959,423, Cl. 525-471.000.

Harris, Jim: *See*—
Marrow, Brett; and Harris, Jim, 4,958,688, Cl. 172-22.000.

Harris, Robert F., to Dow Chemical Company, The. Liquid polymers containing urethane and urea moieties and hydroxyl and/or amino end groups and a process for the preparation thereof. 4,959,499, Cl. 564-59.000.

Harris, William J.; Lysenko, Zenon; and Hurtig, Carl W., to Dow Chemical Company, The. Process to synthesize AB-PBO monomer and phosphate salts thereof. 4,959,492, Cl. 562-453.000.

Harrison, Gail I.: *See*—
Weaver, James C.; Bliss, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail I., 4,959,301, Cl. 435-5.000.

Hart, Terance W.: *See*—
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Hartkopf, Uwe: *See*—
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Hartley, Philip J.; and Walshe, James. Filter socks. 4,959,045, Cl. 493-254.000.

Hartmann, Heinrich: *See*—
Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.

Harwath, Frank L., to Suntec Industries Incorporated. Two-stage gear pump with improved spur gear mounting. 4,958,997, Cl. 418-171.000.

Hasegawa, Jun, to Nippon Sheet Glass Co., Ltd. Laminated structure formed of ceramic color layer and conductive layer. 4,959,270, Cl. 428-426.000.

Hasegawa, Jun: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Hasegawa, Kazuo: *See*—
Obouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, 4,959,805, Cl. 364-562.000.

Hasegawa, Michio; and Sahashi, Masashi, to Kabushiki Kaisha Toshiba. Planar inductor. 4,959,631, Cl. 336-83.000.

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Homma, Masatoshi; Yamaguchi, Teruo; and Hasegawa, Tuneyuki, 4,958,589, Cl. 118-672.000.

Hashimoto, Chikara; Inaba, Hiroshi; Nakase, Kiyoshi; and Yanagida, Yukitoshi, to Central Glass Company, Limited. Electrochromic device for controlling transmittance of light. 4,958,917, Cl. 350-357.000.

Hashimoto, Eiji, to Toyota Jidosha Kabushiki Kaisha. Direct fuel injection type spark ignition internal combustion engine. 4,958,604, Cl. 123-276.000.

Hashimoto, Hiroshi: *See*—
Aonuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Hashimoto, Kenji: *See*—
Kobayashi, Hiroaki; and Hashimoto, Kenji, 4,958,722, Cl. 198-735.300.

Hashimoto, Kunio, to Kabushiki Kaisha Nihon Pipe Conveyor. Tubular belt conveyor. 4,958,724, Cl. 198-819.000.

Hashimoto, Mitsuru: *See*—
Aruga, Tamotsu; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,959,290, Cl. 430-73.000.

Hashimoto, Seiji, to Canon Kabushiki Kaisha. Solid state image pickup apparatus having multi-phase scanning pulse to read out accumulated signal. 4,959,723, Cl. 358-213.110.

Hashimoto, Yasutaka: *See*—
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.

Hatada, Kenzo; and Nagao, Koichi, to Matsushita Electric Industrial Co., Ltd. Lead connection structure. 4,959,590, Cl. 315-169.300.

Hatagishi, Yuuji: *See*—
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Hatano, Kazufumi: *See*—
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Hathaway, Susan J.: *See*—
Gambale, Ronald J.; Hathaway, Susan J.; Longley, Kathryn L.; and Ullman, Timothy J., 4,959,411, Cl. 525-67.000.

Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, to Iwatsu Electric Co., Ltd. Electrophotographic plate-making machine with independent motors for moving the copy holder, conveying rollers and focus region rollers. 4,959,689, Cl. 355-233.000.

Hatori, Toshiyuki: *See*—
Oshima, Masahiko; Ohata, Takumi; and Hatori, Toshiyuki, 4,958,422, Cl. 29-129.500.

Hatta, Naoyuki: *See*—
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Hatta, Shinji: *See*—
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Hatton, Randall C.; and Tyree, Gerald W. Close out fitting. 4,958,743, Cl. 220-288.000.

Hatwar, Tukaram K., to Estman Kodak Company. Method for making an amorphous aluminum-nitrogen alloy layer. 4,959,136, Cl. 204-192.150.

Haub, John G.; Eberhardt, John E.; and Death, David L., to Commonwealth Scientific and Industrial Research Organisation. Determination of properties of coal. 4,959,549, Cl. 250-461.100.

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Hauer, Horst-Walter; and Hauer, Gerda E., 4,958,525, Cl. 073-862.480.

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Haueter, Ernst, to Ascom Autelca AG. Device for the storage, insertion, and removal of containers. 4,958,976, Cl. 414-331.000.

Haueter, Walter; Pfaffhauser, Hans-Ulrich; and Benz, Karl. Method and apparatus for treating bulk material. 4,958,443, Cl. 34-57.00D.

Hauk, Rolf, to Deutsche Voest-Alpine Industrieanlagenbau GmbH. Apparatus for producing sponge iron or pig iron. 4,958,808, Cl. 266-154.000.

Haun, Michael J.: *See*—
Donohue, Paul C.; Hang, Kenneth W.; and Haun, Michael J., 4,959,330, Cl. 501-8.000.

Hawel, Hans: *See*—
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Hayakawa, Hirokazu: *See*—
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Hayakawa, Kiyoharu: *See*—
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.

Hayashi, Masaaki: *See*—
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.

Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, to Nippon Kayaku Kabushiki Kaisha; and Tama Biochemical Co., Ltd. 23-Phenylsteroids. 4,959,097, Cl. 71-112.000.

Hayashi, Tetsuya: *See*—
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.

Hayashi, Yoshiyuki: *See*—
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Hayashi, Yuji; Sakakibara, Susumu; and Maeda, Katsumi, to Minolta Camera Kabushiki Kaisha. Developing device with retractable cutoff member. 4,959,692, Cl. 355-253.000.

Haydu, Bartley A.: *See*—
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Hazel, Bruce: *See*—
Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.

Head, John: *See*—
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Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palanisamy, Ponnusamy, to Delco Electronics Corporation. Ceramic hybrid integrated circuit having surface mount device solder stress reduction. 4,959,751, Cl. 361-406.000.

Heckethorn, John E.; and Whittle, Danny J., to 3900 Corp. Dual loop hose clamp. 4,958,419, Cl. 24-283.000.

Hegedus, Leslie J. Mobile exhibition unit. 4,958,874, Cl. 296-26.000.

Heijnen, Wilhelmus H. P. M., to Shell Internationale Research Maatschappij B.V. Pressure energized sealing joint. 4,958,856, Cl. 285-14.000.

Heimer, Edgar P.: *See*—
Felix, Arthur M.; and Heimer, Edgar P., 4,959,352, Cl. 514-9.000.

Heimer, Karl-Heinz, to General Motors Corporation. Brace for connecting an auxiliary component to an internal combustion engine. 4,958,603, Cl. 123-195.00A.

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Heinz, Hans-Detlef: *See*—
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Heinze, Jurgen: *See*—
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Heinzman, Stephen W.; Eis, Michael J.; and Armstrong, Molly P., to Procter & Gamble Company, The. Amino-functional compounds as

builder/dispersants in detergent compositions. 4,959,409, Cl. 525-61.000.
Heismann, Richard A., to Toro Company, The. Rope guide. 4,958,483, Cl. 56-17.500.
Heisterhagen, Rolf: *See*—
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.
Heiwa Seiki Kogyo Co., Ltd.: *See*—
Ishikawa, Masao, 4,959,671, Cl. 354-81.000.
Helffrich, David J.: *See*—
Christensen, Dean; Helffrich, David J.; Scullion, Christopher K.; and Hindle, Edward W., 4,959,795, Cl. 364-464.030.
Helix Medical, Inc.: *See*—
Seder, Edmund V.; and Sardi, William F., 4,959,048, Cl. 604-9.000.
Heller, Rudolf; and Michel, Alfred, to Carl-Zeiss-Stiftung. Operating table. 4,958,817, Cl. 269-323.000.
Hellings, Thomas D. G.: *See*—
Lee, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoog, Ivan H., 4,959,294, Cl. 430-304.000.
Helms, Israel F., to Brown & Sharpe Manufacturing Company. Coordinate measuring machine with vibration damper. 4,958,437, Cl. 33-503.000.
Hemans, James W. Hand tool for picking up animal droppings. 4,958,871, Cl. 294-1.400.
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Hemath, Klaus H., to Indugas, Inc. Pulse burner and method of operation. 4,959,009, Cl. 431-1.000.
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Hendricks, Udo W.: *See*—
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.
Henkel Kommanditgesellschaft auf Aktien: *See*—
Baehr, Bernd D.; Rall, Ulrich; van Delden, Hildegard; and Lillotte, Wolfgang, 4,959,075, Cl. 8-111.000.
Busch, Peter; and Thiele, Klaus, 4,958,647, Cl. 132-119.100.
Hourticolon, Roland; and Kloettschen, Hermann, 4,958,719, Cl. 198-635.000.
Kuenzel, Werner; and Vierkoetter, Peter, 4,958,749, Cl. 222-133.000.
Ravi, Prasad S.; Kickle, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., 4,959,468, Cl. 536-127.000.
Henkel Research Corporation: *See*—
Renga, James M.; Olivero, Alan G.; and Bosse, Mark, 4,959,488, Cl. 560-76.000.
Hensley, Albert L.: *See*—
Kukes, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., 4,959,140, Cl. 208-59.000.
Herbin, Patrick; and Lacroix, Jean-Claude, to Essilor International (Compagnie Generale d'Optique). Apparatus for applying a protective film on one face of a series of ophthalmic lenses. 4,959,118, Cl. 156-512.000.
Herbst, Thomas; and Jungwirth, Dieter, to Dyckerhoff & Widmann Aktiengesellschaft. Anchoring arrangement for a rod-shaped tension member formed of fiber reinforced composite material. 4,958,961, Cl. 405-260.000.
Hergeth Hollingsworth GmbH: *See*—
Lasenga, Werner, 4,958,404, Cl. 19-98.000.
Herman, Thomas: *See*—
Lidow, Alexander; and Herman, Thomas, 4,959,699, Cl. 357-23.700.
Herman, Timm R.: *See*—
Annis, Jeffrey R.; Herman, Timm R.; and Strobel, Ronald T., 4,958,541, Cl. 81-479.000.
Hess, Arthur E.; and Sanger, Gregory M., to United Technologies Corporation. Optical surface quality improving arrangement. 4,958,463, Cl. 51-72.00R.
Hess, Norman B. Stanchion. 4,958,793, Cl. 248-122.000.
Hesse, Philip W.: *See*—
Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., 4,958,763, Cl. 228-193.000.
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Stufler, Siegfried; Hetzendorf, Georg; Fransen, Benedictus C. H.; Rijnbeek, Antonius G.; and Schmickl, Helfried, 4,959,754, Cl. 361-527.000.
Heuft-Qualiplus B.V.: *See*—
Swart, Nicolaas C., 4,959,538, Cl. 250-223.00B.
Hewlett-Packard Company: *See*—
Boyd, David W., 4,959,541, Cl. 250-237.00R.
Dillman, Norman G., 4,959,608, Cl. 324-132.000.
Kaplinsky, George, 4,959,667, Cl. 346-140.00R.
Kuderer, Hubert, 4,958,928, Cl. 356-328.000.
Heywang, Gerhard: *See*—
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, 4,959,430, Cl. 526-257.000.
Hi-Tek Polymers, Inc.: *See*—
Yeh, Michael H., 4,959,464, Cl. 536-114.000.
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Toura, Kosuke, to Konica Corporation. Method of producing analytical curve. 4,959,796, Cl. 364-497.000.
Higami, Sadao: *See*—
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.
Higashi, Tatsuji: *See*—
Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, 4,959,296, Cl. 430-302.000.
Higashibata, Kouji; and Suzuki, Hironori, to Kabushiki Kaisha Toshiba. Y-Ba-Cu-O superconductor for containing antimony or boron to increase current density. 4,959,348, Cl. 505-1.000.
Higginbottom, Charles: *See*—
Cooke, Richard D.; and Higginbottom, Charles, 4,958,714, Cl. 192-111.00A.
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., to Motorola, Inc. Coil-less overtone crystal oscillator. 4,959,624, Cl. 331-116.00R.
Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, to Toho Kagaku Kogyo Co., Ltd. Method for plugging lost circulation areas and lost circulation material to be used therefor. 4,958,685, Cl. 166-291.000.
Hijikata, Kenji: *See*—
Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, 4,959,404, Cl. 524-267.000.
Hillstrom, Brian J.: *See*—
Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., 4,958,458, Cl. 40-156.000.
Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., to Marketing Displays, Inc. Poster display device with longitudinal retention of frame sections by inserts. 4,958,458, Cl. 40-156.000.
Hillyer, Janice L. Retainer for a percutaneous tube. 4,959,055, Cl. 604-179.000.
Hinatase, Fumio: *See*—
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatase, Fumio, 4,958,606, Cl. 123-316.000.
Hindin, Roger M.: *See*—
Dunk, Paul; Hindin, Roger M.; and Miles, Peter J., 4,959,264, Cl. 428-331.000.
Hindle, Edward W.: *See*—
Christensen, Dean; Helffrich, David J.; Scullion, Christopher K.; and Hindle, Edward W., 4,959,795, Cl. 364-464.030.
Hipp, James. Fluid operated vibratory jar with rotating bit. 4,958,691, Cl. 175-296.000.
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Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, to Mitsubishi Kasei Corporation. Copolymerized polyester having excellent transparency and gas barrier properties. 4,959,421, Cl. 525-437.000.
Hirama, Eiichi, to Marcon Electronics Company, Ltd. Metalized film capacitor and method of manufacturing the same. 4,959,652, Cl. 361-310.000.
Hirano, Sadayuki: *See*—
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
Hiraoka, Toyoki; Murakami, Yuichi; and Okitsu, Nobuyuki, to Nissan Motor Co., Ltd. Internal combustion engine with crankcase ventilation system. 4,958,613, Cl. 123-572.000.
Hirata, Minoru: *See*—
Terao, Shinji; and Hirata, Minoru, 4,959,362, Cl. 514-231.500.
Hirayama, Akihiko: *See*—
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
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Yamasaki, Hirotaka; and Hironaka, Yoshio, 4,959,487, Cl. 558-343.000.
Hirose, Satoshi: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Resbutsu, Tadashi, 4,958,823, Cl. 271-9.000.
Hirschmann, Walter, to Patent Treuhand Gesellschaft fur elektrische Gluhlampen m.b.H. Rectifier-inverter circuit with low harmonic feedback, particularly for operation of fluorescent lamps. 4,959,591, Cl. 315-209.00R.
Hirt, Alfred, to MAN Technologie GmbH. Device for producing images on printing image carriers. 4,959,668, Cl. 346-155.000.
Hishi, Wakichiro: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Hitachi Koki Co., Ltd.: *See*—
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
Saito, Susumu; and Arimoto, Akira, 4,959,665, Cl. 346-108.000.
Hitachi, Ltd.: *See*—
Aritomi, Toshiaki, 4,958,637, Cl. 128-653.00A.
Homma, Masatoshi; Yamaguchi, Teruo; and Hasegawa, Tuneyuki, 4,958,589, Cl. 118-672.000.
Imaide, Takuya; and Kinugasa, Toshiro, 4,959,727, Cl. 358-228.000.
Isomura, Satoru; Iwabuchi, Masato; and Ogiue, Katsumi, 4,959,704, Cl. 357-41.000.
Iyoda, Hiroumi, 4,958,473, Cl. 52-646.000.
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
Kimura, Tomoaki, 4,958,677, Cl. 164-452.000.

Kochi, Masbanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.
Kuroda, Shigeaki; Oguni, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitu, 4,959,733, Cl. 358-338.000.
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, 4,959,778, Cl. 364-200.000.
Saito, Susumu; and Arimoto, Akira, 4,959,665, Cl. 346-108.000.
Saitoh, Toshio; Takahashi, Noriyoshi; and Satoh, Masaki, 4,959,575, Cl. 310-213.000.
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Esdo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Wada, Hirohumi, 4,959,815, Cl. 365-230.060.
Yamamoto, Etsuji; and Kohno, Hideki, 4,959,613, Cl. 324-318.000.
Yoneda, Kenzi; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.
Yosida, Nobuo; and Shimizu, Teruhisa, 4,959,835, Cl. 371-51.100.

Hitachi Maxell, Ltd.: *See*—
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.

Hitachi Microcomputer Engineering: *See*—
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.

Hitco: *See*—
Miller, Wilbur T.; Calamito, Dominic P.; and Pusch, Richard H., 4,958,663, Cl. 139-384.00R.

Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinataae, Fumio, to Mazda Motor Corporation. Supercharged engine. 4,958,606, Cl. 123-316.000.

Hoang, Peter P. M.: *See*—
Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 4,959,420, Cl. 525-331.700.

Hobart Corporation: *See*—
Treiber, Fritz F., 4,958,479, Cl. 53-441.000.

Hochstein, Peter A. Automatic battery powered video light. 4,959,755, Cl. 362-4.000.

Hoechst AG: *See*—
Ulrich, Hannajorg; and Westermann, Lothar, 4,959,170, Cl. 252-135.000.

Hoechst Celanese Corporation: *See*—
Stautzenberger, Adin L.; Quick, Edward E.; and Lobo, Peter F., 4,959,449, Cl. 528-271.000.

Hoechst-Roussel Pharmaceuticals Inc.: *See*—
Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., 4,959,378, Cl. 514-352.000.
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.

Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., to General Electric Company. Electric incandescent lamp and method of manufacture therefor. 4,959,585, Cl. 313-271.000.

Hoescht Aktiengesellschaft: *See*—
Grau, Ulrich, 4,959,351, Cl. 514-4.000.

Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., to General Motors Corporation. Check valve with ephemeral seal. 4,958,654, Cl. 137-72.000.

Hoffmann, Gerhard, to BASF Aktiengesellschaft. Flexographic relief printing plate. 4,959,285, Cl. 430-11.000.

Hoffmann-la Roche Inc.: *See*—
Felix, Arthur M.; and Heimer, Edgar P., 4,959,352, Cl. 514-9.000.
Mohacsi, Erno; and O'Brien, Jay P., 4,959,359, Cl. 514-211.000.
Walser, Armin, 4,959,361, Cl. 514-220.000.

Hofler, Thomas J.; and Garrett, Steven L., to United States of America, Navy. Flexural disk fiber optic hydrophone. 4,959,539, Cl. 250-227.190.

Hofmann, Heinrich; and Troster, Manfred, to FAG Kugelfischer Georg Schafer (KGaA). Bearing for wheel mount. 4,958,944, Cl. 384-512.000.

Hogan, Billy M.: *See*—
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 4,959,194, Cl. 419-46.000.

Hohjoh, Tadashi: *See*—
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.

Holbrook-Patterson, Inc.: *See*—
Mendenhall, David L., 4,958,390, Cl. 5-110.000.

Holman, Thomas H., Jr., to Motorola Computer X. Write-shared cache circuit for multiprocessor system. 4,959,777, Cl. 364-200.000.

Holmes, Gerald E.; and Cannon, Fleming V., Jr., to Century Wrecker Corporation. Quick connect/disconnect wheel cradle arrangement for wheel lift towing systems. 4,958,980, Cl. 414-563.000.

Holmes, Iris. Pest exterminating composition. 4,959,221, Cl. 424-659.000.

Holtermann, Ludwig K.; and Lee, Leighton, II, to Lee Company, The. Check valve. 4,958,661, Cl. 137-843.000.

Holtje, Bruce E.: *See*—
Trainor, John W.; and Holtje, Bruce E., 4,959,690, Cl. 355-245.000.

Holtmyer, Marlin D.; and Hunt, Charles V., to Halliburton Company. Polyampholytes-high temperature polymers and method of use. 4,959,163, Cl. 252-8.551.

Homac Mfg. Company: *See*—
McGrane, Eugene W., 4,959,508, Cl. 174-84.00C.

Homayoun, Habib: *See*—
Digby, Dennis; and Homayoun, Habib, 4,958,641, Cl. 128-702.000.

Homma, Masatoshi; Yamaguchi, Teruo; and Hasegawa, Tuneyuki, to Hitachi, Ltd. Continuous melt-plating apparatus. 4,958,589, Cl. 118-672.000.

Honda Gikeu Kogyo K.K.: *See*—
Kato, Akira; and Yano, Toru, 4,958,612, Cl. 123-489.000.

Honda Gikeu Kogyo Kabushiki Kaisha: *See*—
Aoi, Tomio; and Kameda, Toshihiro, 4,958,984, Cl. 415-55.100.
Iwakura, Masato; and Nakano, Hiroshi, 4,958,451, Cl. 40-204.000.
Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, 4,958,492, Cl. 60-327.000.
Maki, Kazuya; and Yamaguchi, Kouji, 4,958,494, Cl. 60-468.000.
Maruyama, Iwao; and Uzuyama, Kimitake, 4,959,521, Cl. 219-121.630.
Matsuoka, Isamu; and Sato, Noboru, 4,959,137, Cl. 204-299.0BC.
Shiraishi, Shuji, 4,959,794, Cl. 364-426.030.
Yamaguchi, Kouji, 4,958,495, Cl. 60-468.000.

Honda, Koichi: *See*—
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, 4,959,479, Cl. 548-255.000.

Honda Motor Co., Ltd.: *See*—
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.

Honda, Takumi: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Honeywell Inc.: *See*—
Bjorke, Merlin D.; and Thue, Baard H., 4,959,654, Cl. 342-120.000.
Gerhart, Paul B., 4,959,768, Cl. 364-187.000.
Rasinski, John E.; and Delong, Christian P., 4,959,015, Cl. 434-2.000.
Rawski, John M., 4,958,904, Cl. 350-96.200.
Ruby, Joseph H., 4,959,594, Cl. 315-397.000.
Samad, Tariq, 4,958,939, Cl. 382-35.000.

Hongel, Chester C., to Electronic Specialty Corporation. Relay contact protective circuit. 4,959,746, Cl. 361-13.000.

Hongo, Yasuo, to Fuji Electric Co., Ltd. Method for determining binary coding threshold value. 4,959,869, Cl. 382-51.000.

Honjo, Masahiro, to Matsushita Electric Industrial Co., Ltd. Frequency demodulation circuit. 4,959,620, Cl. 329-327.000.

Hopf, Frederick R.: *See*—
Ozenrider, Bryce C.; Hopf, Frederick R.; and , 4,959,248, Cl. 427-385.500.

Hoppner, Klaus; Friedrich, Reinhard; and Weiss, Hermann, to Andreas Stihl. Internal combustion engine. 4,958,602, Cl. 123-195.00C.

Hori, Yasuro: *See*—
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.

Horibe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, to Nippondenso Co., Ltd. Automotive alternator. 4,959,576, Cl. 310-239.000.

Horiishi, Nanao: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.

Horikomi, Kazutoshi: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomiso, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Horikoshi, Yukio: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-132.000.

Horimai, Hideyoshi; and Aoki, Yoshio, to Sony Corporation. Magnetooptical recording apparatus with constant leakage magnetic and pulse modulated magnetic field. 4,959,820, Cl. 369-13.000.

Horizons International Foods, Inc.: *See*—
Aulik, David J.; and Christensen, Robert E., 4,959,240, Cl. 426-637.000.

Horng, Liou-Liang: *See*—
Crutchfield, Marvin M.; Horng, Liou-Liang; and Schultz, Robert G., 4,959,496, Cl. 562-583.000.

Horvath, Bela: *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Horvath, Edward, to Otto Bock Orthopadische Industrie Besitz-Und Verwaltungs - KG. Hydraulic controller, especially for the movement of a prosthetic joint. 4,958,705, Cl. 188-314.000.

Hoshi, Hitoshi: *See*—
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.

Hoshi, Nobuyoshi: *See*—
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.

Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, to Siemens Aktiengesellschaft. Differential amplifier having externally controllable power consumption. 4,959,621, Cl. 330-253.000.

Hourticolon, Roland; and Kloettschen, Hermann, to Henkel Kommanditgesellschaft auf Aktien. Apparatus for scraping solid materials from a conveyor surface. 4,958,719, Cl. 198-635.000.

Houser, Clarence G., to Phillips Petroleum Company. Drummed waste incineration. 4,958,578, Cl. 110-246.000.

Houts, Thomas M.: *See*—
Milburn, Gary L.; Rabbie, Judith; and Houts, Thomas M., 4,959,303, Cl. 435-7.000.

Howells, Roger A., to Air Products and Chemicals, Inc. Exhaust gas media separator with recycling and dust collection. 4,958,466, Cl. 51-425.000.

Howlette, Edward L. Security system for computer software. 4,959,861, Cl. 380-4.000.

Hsu, Paul K. H. Device for fitting a hosel on a club shaft. 4,958,424, Cl. 29-252.000.

Huang, Shih-Hsing: *See*—
Mercola, Gerald K.; and Huang, Shih-Hsing, 4,959,833, Cl. 371-32.000.

Huang, Shu-Jen W.; and Stenger, Claudia V., to Nalco Chemical Company. Paint detackification using inorganic particles. 4,959,147, Cl. 210-712.000.

Hubbell Incorporated: *See*—
Kuntz, Robert J., 4,958,676, Cl. 164-340.000.
Neuroth, David H., 4,959,022, Cl. 439-589.000.

Huels Aktiengesellschaft: *See*—
Bartmann, Martin; Feinauer, Roland; Hartkopf, Uwe; and Schlobohm, Michael, 4,959,403, Cl. 524-169.000.

Huff, Karl: *See*—
Foltin, Eckard; Depcik, Hans-Werner; Huff, Karl; Pischtschan, Alfred; Yesildag, Mehmet C.; and Erkelenz, Reiner, 4,959,406, Cl. 524-413.000.

Huggins, Jack D.; and Pannel, John. Exercise apparatus. 4,958,830, Cl. 272-69.000.

Hughes Aircraft Company: *See*—
Lo, Thomas K.; Sacks, Jack M.; and Simoni, Wayne P., 4,959,714, Cl. 358-125.000.
Owechko, Yuri; and Soffer, Bernard H., 4,958,914, Cl. 350-342.000.
Owechko, Yuri, 4,959,532, Cl. 250-201.900.
Rochester, James R., 4,958,899, Cl. 350-96.200.
Rockwell, Davis A.; Lind, Richard C.; and Pepper, David M., 4,958,908, Cl. 350-311.000.
Woolley, Richard L., 4,959,800, Cl. 364-516.000.

Humpolik, Bohumil, to Saddeutsche Kuhlerfabrik Julius Fr. Behr GmbH & Co. KG. Process and an arrangement for producing a supporting body for a catalytic reactor. 4,958,428, Cl. 29-890.000.

Hung, Po-Chieh; and Kanesniwa, Tatsuya, to Konica Corporation. Method and apparatus for correcting the color of a printed image. 4,959,711, Cl. 358-80.000.

Huni, Jean-Paul: *See*—
Dube, Ghyslain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,959,100, Cl. 75-10.190.

Hunsbedt, Anstein; and Boardman, Charles E., to General Electric Company. Indirect passive cooling system for liquid metal cooled nuclear reactors. 4,959,193, Cl. 376-299.000.

Hunt, Charles C.: *See*—
Reddy, Malireddy S.; Mullen, John; Washam, Clinton J.; Brown, C. Gordon; and Hunt, Charles C., 4,959,229, Cl. 426-39.000.

Hunt, Charles V.: *See*—
Holtmyer, Marlin D.; and Hunt, Charles V., 4,959,163, Cl. 252-8.551.

Hunter Douglas International N.V.: *See*—
Spangenberg, Robbert E., 4,958,421, Cl. 29-24.500.

Hunter, Frederick J.: *See*—
Ng, Howard C. H.; and Hunter, Frederick J., 4,959,267, Cl. 428-390.000.

Hunter, Gordon B.: *See*—
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.

Hunter, Richard L.: *See*—
McIver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.

Hurlburt, James P.; and Lagasse, Michael R. Vivarium. 4,958,593, Cl. 119-5.000.

Hurtig, Carl W.: *See*—
Harris, William J.; Lysenko, Zenon; and Hurtig, Carl W., 4,959,492, Cl. 562-453.000.

Hutchison, Steven; and Bruno, Leonard, to United Technologies Corporation. Solder-coating fixture and arrangement. 4,958,588, Cl. 118-423.000.

Huynh-Tran, Truc-Chi, to W. R. Grace & Co.-Conn. Acidic adhesion promoters for PVC plastisols. 4,959,399, Cl. 523-437.000.

Hydro-Quebec: *See*—
Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.

I. C. Moller A/S: *See*—
Pedersen, Hans N., 4,958,958, Cl. 405-154.000.

Ian Wilson Technology Limited: *See*—
Wilson, Alexander I., 4,959,099, Cl. 72-244.000.

Ibe, Makoto: *See*—
Kochi, Mashanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.

Ichihashi, Kunio: *See*—
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.

Ichii, Seiji: *See*—
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

Ichijima, Seiji: *See*—
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.

Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotarou, to Matsushita Electric Industrial Co., Ltd. Air conditioning apparatus for use in automobile. 4,958,504, Cl. 62-244.000.

Ichikoh Industries, Ltd.: *See*—
Nakata, Yutaka, 4,959,757, Cl. 362-61.000.

ICS Electronics Corporation: *See*—
Mercola, Gerald K.; and Huang, Shih-Hsing, 4,959,833, Cl. 371-32.000.

Ide, Tatsumi: *See*—
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.

Idemitsu Kosan Co., Ltd.: *See*—
Yamasaki, Hirotaka; and Hironaka, Yoshio, 4,959,487, Cl. 558-343.000.

Idemitsu Petrochemical Co., Ltd.: *See*—
Ashida, Takashi; Kunishi, Noriyuki; and Yamamoto, Koji, 4,959,456, Cl. 528-371.000.

Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, to Kawasaki Steel Corporation. Process and equipment for micro-pattern forming on roll surface, metal sheets for pressworking prepared by the roll, and method of preparing same. 4,959,275, Cl. 428-603.000.

Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, to Mitsui Toatsu Chemicals, Inc.; and Lion Corporation. Self-hardenable material. 4,959,104, Cl. 106-85.000.

Iizuka, Haruo: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, to NEC Corporation. Electromagnet relay. 4,959,627, Cl. 335-106.000.

Ijuin, Kazuya; Otsuki, Shinsichiro; Nakano, Yuji; and Ogushi, Hiroshi, to Canon Kabushiki Kaisha. Sheet conveying and reading apparatus having a light-intercepting member for reducing noise. 4,959,536, Cl. 250-216.000.

Ikarus Karosszeria es Jarmugyar: *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Ikeda Bussan Co., Ltd.: *See*—
Akai, Mikio; and Mori, Masami, 4,959,184, Cl. 264-40.300.

Ikeda, Shigeyuki: *See*—
Iwamoto, Hironori; and Ikeda, Shigeyuki, 4,958,628, Cl. 128-36.000.

Ikeda, Tanejiro: *See*—
Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.

Ikekawa, Nobuo: *See*—
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.

Ikemoto, Hiroyuki: *See*—
Buma, Shuuichi; and Ikemoto, Hiroyuki, 4,958,850, Cl. 280-714.000.

Ikezawa, Atsushi: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanzyama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.

Illinois Tool Works, Inc.: *See*—
Briggs, Paul C.; and Gosiewski, Donald E., 4,959,405, Cl. 524-321.000.

Imagitek, Inc.: *See*—
Trainor, John W.; and Holtje, Bruce E., 4,959,690, Cl. 355-245.000.

Imago Quaestus, Inc.: *See*—
Meyer, James M.; Schmidt, David A.; and Donner, Peter M., 4,959,582, Cl. 312-307.000.

Imai, Masafumi: *See*—
Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, 4,959,427, Cl. 526-142.000.

Imai, Tadashi; and Okitu, Shinobu, to Kabushiki Kaisha Toshiba. Automatic frequency control apparatus for FM receivers. 4,959,472, Cl. 455-164.000.

Imai, Tomoyuki: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.

Imaide, Takuya; and Kinugasa, Toshiro, to Hitachi, Ltd. Image pick-up apparatus. 4,959,727, Cl. 358-228.000.

Imanari, Yoshifumi, to Nippon Seiko Kabushiki Kaisha. Support unit. 4,958,941, Cl. 384-474.000.

Imbeaux, Jean-Claude: *See*—
Delacroix, Eugene; Fargeas, Jean-Marc; and Imbeaux, Jean-Claude, 4,959,619, Cl. 329-306.000.

Import-Export, Research & Development, Inc.: *See*—
Baggott, George T., 4,959,763, Cl. 362-382.000.
Inaba, Hiroshi: *See*—
Hashimoto, Chikara; Inaba, Hiroshi; Nakase, Kiyoshi; and Yanagida, Yukitoshi, 4,958,917, Cl. 350-357.000.
Inaba, Shin-ichi; and Nagahama, Hideki, to Chisso Corporation. Process for manufacturing silane. 4,959,200, Cl. 423-347.000.
Inaba, Yutaka; Kawaginhi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, to Canon Kabushiki Kaisha. Image forming apparatus. 4,958,912, Cl. 350-333.000.
Inaba, Yutaka: *See*—
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
Indugas, Inc.: *See*—
Hemath, Klaus H., 4,959,009, Cl. 431-1.000.
Ingold Messtechnik AG: *See*—
Brinkmann, Heinz-Jurgen; Buhler, Hans W.; and Lohrum, Albert, 4,959,138, Cl. 204-414.000.
Inman, Wayne D.: *See*—
Crews, Phillip; Matthews, Thomas R.; and Inman, Wayne D., 4,959,370, Cl. 514-280.000.
Ino, Mayumi: *See*—
Minamitaka, Junichi; Sato, Kunio; and Ino, Mayumi, 4,958,552, Cl. 84-603.000.
Inoue, Hideki: *See*—
Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, 4,959,713, Cl. 358-108.000.
Inoue, Hitoshi: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Morosaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
Institut Francais du Petrole: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.
Institut Molekulyarnoy Biologii I Biokhimii Akademii Nauk KazSSR: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.
Institute of Gas Technology: *See*—
Kardas, Alan, 4,958,619, Cl. 126-85.00R.
Instromedix, Inc.: *See*—
Digby, Dennis; and Homayoun, Habib, 4,958,641, Cl. 128-702.000.
Intelmatec Corporation: *See*—
Akagawa, Minoru, 4,958,873, Cl. 294-93.000.
Interactive Video Disc Systems, Inc.: *See*—
Foster, Richard W., 4,959,734, Cl. 358-341.000.
Interatom GmbH: *See*—
Knaak, Joachim, 4,958,523, Cl. 73-861.110.
International Business Machines: *See*—
Bardell, Paul H., Jr., 4,959,832, Cl. 371-27.000.
International Business Machines Corporation: *See*—
Fan, Bunsen; Oprysko, Modest M.; and Rand, Ricky A., 4,959,540, Cl. 250-227.120.
Landers, John D., Jr., 4,959,773, Cl. 364-200.000.
International Flavors & Fragrances Inc.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.
International Marketing, Inc.: *See*—
Fogal, Robert D., Sr.; Fogal, Robert D., Jr.; and Morgan, George E. D., 4,958,587, Cl. 118-206.000.
International Paper Company: *See*—
Tsai, Ted Y., 4,959,124, Cl. 162-65.000.
International Rectifier Corporation: *See*—
Lidow, Alexander; and Herman, Thomas, 4,959,699, Cl. 357-23.700.
International Standard Electric Corporation: *See*—
Cleemput, Camiel D., 4,959,246, Cl. 427-97.000.
InterVoice Inc.: *See*—
Hammond, Dwain H.; Cave, Ellis K.; and Polcyn, Michael J., 4,959,854, Cl. 379-157.000.
Inuzima, Takashi: *See*—
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.
Inverness Corporation: *See*—
Mann, Samuel J., 4,958,951, Cl. 401-1.000.
Ionspec Corporation: *See*—
McIver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.
Irwin, James S.: *See*—
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.00R.
Isaac, Otto: *See*—
Sauerbier, Dieter; Isaac, Otto; and Brade, Wolfgang P., 4,959,215, Cl. 424-422.000.
Isayama, Shigeru: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tau, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Iscor Limited: *See*—
Lake, Alan W., 4,959,160, Cl. 252-340.000.
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, to Seikosha Co., Ltd. Camera system. 4,959,680, Cl. 354-435.000.
Ishida, Masaji: *See*—
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.
Ishida, Tsuyoshi: *See*—
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.
Ishida, Yoshiaki: *See*—
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.
Ishihara, Shunichi: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
Ishihara, Takashi: *See*—
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Toura, Kosuke, 4,959,796, Cl. 364-497.000.
Ishihara, Yoshiko. Artificial potted flower. 4,958,768, Cl. 239-34.000.
Ishii, Isamu: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
Ishii, Kazuo: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Ojima, Juji; Ishii, Kazuo; and Numakura, Punio, 4,959,041, Cl. 474-111.000.
Ishii, Ryuichi: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.
Ishii, Yoshitaro: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Ishikawa, Atsushi: *See*—
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.
Ishikawa, Masao, to Heiwa Seiki Kogyo Co., Ltd. Vertical tilting apparatus of tripod head. 4,959,671, Cl. 354-81.000.
Ishikawa, Osamu: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
Ishikawa, Yoshikazu: *See*—
Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, 4,958,492, Cl. 60-327.000.
Ishikura, Shinichi: *See*—
Miyazono, Tadafumi; and Ishikura, Shinichi, 4,959,417, Cl. 525-274.000.
Ishizaki, Kunihiko: *See*—
Shimomura, Tadao; Harada, Nobuyuki; and Ishizaki, Kunihiko, 4,959,060, Cl. 604-368.000.
Isobe, Kunio: *See*—
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.
Isomichi, Kanji: *See*—
Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.
Isomura, Satoru; Iwabuchi, Masato; and Ogiue, Katsumi, to Hitachi, Ltd. Semiconductor integrated circuit device. 4,959,704, Cl. 357-41.000.
Isothermics Incorporated: *See*—
Chaudoin, James J.; and Linford, Michael R., 4,958,456, Cl. 43-124.000.
Istituto Farmacologico Serono S.p.A.: *See*—
Barbetti, Manlio, 4,959,354, Cl. 514-21.000.
Isuzu Ceramics Research Institute Co., Ltd.: *See*—
Kawamura, Hideo, 4,958,497, Cl. 60-608.000.
Isuzu Motors Limited: *See*—
Kawamura, Hideo, 4,958,708, Cl. 192-0.098.
Itabashi, Masaki: *See*—
Noguera, Angel R.; Planella, Carlos C.; and Itabashi, Masaki, 4,959,206, Cl. 424-70.000.
ITI/CLM Impianti Tecnici Industriali S.p.A.: *See*—
Mancini, Flavio, 4,958,573, Cl. 104-2.000.
Ito, Hideo, to Minolta Camera Kabushiki Kaisha. Copying machine. 4,959,684, Cl. 355-55.000.
Ito, Shotarou: *See*—
Ichikawa, Toru; Nishihata, Hideo; Kajoroku, Nobuo; and Ito, Shotarou, 4,958,504, Cl. 62-244.000.
Ito, Yujiro, to Sony Corporation. Optical space transmission apparatus. 4,958,902, Cl. 350-96.180.
Itoh, Hiroki, to Mitsubishi Denki Kabushiki Kaisha. Method for forming a thin film. 4,959,242, Cl. 427-38.000.
Itoh, Takuji: *See*—
Miura, Tadashi; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.
Itoh, Yasuo: *See*—
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryoshei, 4,959,812, Cl. 365-185.000.

ITT Corporation: *See*—
Muzilay, Steven Z., 4,959,027, Cl. 439-655.000.
Iwabuchi, Masato: *See*—
Isomura, Satoru; Iwabuchi, Masato; and Ogino, Katsumi, 4,959,704, Cl. 357-41.000.
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, to Kabushiki Kaisha Toshiba. Semiconductor integrated circuit. 4,959,816, Cl. 365-233.500.
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, to Sanyo Electric Co., Ltd. Paper feeding stand. 4,958,823, Cl. 271-9.000.
Iwaki, Tetsuhiro; and Seikaku, Hazime, to Mazda Motor Corporation. Automotive door trim mounting structure. 4,958,883, Cl. 296-152.000.
Iwakura, Masato; and Nakano, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle license plate mounting mechanism. 4,958,451, Cl. 40-204.000.
Iwamatsu, Yoshiyuki: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-135.000.
Iwamoto, Hironori; and Ikeda, Shigeyuki, to Matsushita Electric Works, Ltd. Hand-held vibratory massager. 4,958,628, Cl. 128-36.000.
Iwamoto, Masaaori: *See*—
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.
Iwamoto, Tamio: *See*—
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.
Iwano, Fumiyuki, to Shikoku Kakoki Co., Ltd. Apparatus for adjusting level of liquid to be filled into packaging tube. 4,958,665, Cl. 141-95.000.
Iwata, Michihiro: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.
Iwatsu Electric Co., Ltd.: *See*—
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.
Iyoda, Hiroumi, to Hitachi, Ltd. Frame, angle member for use in the frame and method of making joint portion of the angel member. 4,958,473, Cl. 52-646.000.
Izatt, Reed M.: *See*—
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.
J. Eberspacher: *See*—
Wirth, Georg; and Wirth, Siegfried, 4,958,491, Cl. 60-299.000.
J. M. Voith GmbH: *See*—
Eckhardt, Roland, 4,958,442, Cl. 33-783.000.
J. T. Baker, Inc.: *See*—
Schwartzkopf, George; Covington, John B.; and Gabriel, Kathleen B., 4,959,293, Cl. 430-189.000.
Jackson Laboratory, The: *See*—
Taketo, Makoto, 4,959,313, Cl. 435-69.100.
Jackson, Richard L.: *See*—
Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., 4,959,392, Cl. 514-712.000.
Jackson, Winston J., Jr.: *See*—
Morris, John C.; and Jackson, Winston J., Jr., 4,959,450, Cl. 528-272.000.
Jacobsen, Gary: *See*—
Jacobsen, Roger V., 4,958,455, Cl. 40-495.000.
Jacobsen, Roger V., to Jacobsen, Gary. Pivotless wheel indicia display device. 4,958,455, Cl. 40-495.000.
Jacquier, Bernard: *See*—
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.
Jaguar Cars Limited: *See*—
Parsons, Bryan N. V., 4,958,531, Cl. 74-63.000.
Jain, Praveen K., to Canada, National Research Council of Canada/-Conseil National de Recherches du. AC/DC converter using resonant network for high input power factor. 4,959,766, Cl. 363-48.000.
Jameson, Graeme J. Aeration apparatus. 4,959,183, Cl. 261-87.000.
Janda, Dennis J., to B. F. Goodrich Company, The. Bulk polymerized molded products containing cycloolefin monoments with microencapsulated blowing agents. 4,959,395, Cl. 521-54.000.
Jang, Cheng-Houng. Automatic stopping device for the intravenous drip. 4,959,053, Cl. 604-127.000.
Jang, G. David. Limacon geometry balloon angioplasty catheter systems and method of making same. 4,958,634, Cl. 606-194.000.
Jannson, Joanna L.: *See*—
Jannson, Tomasz P.; and Jannson, Joanna L., 4,958,892, Cl. 350-3.600.
Jannson, Tomasz P.; and Jannson, Joanna L., to Physical Optics Corporation. Diffraction coherence filter. 4,958,892, Cl. 350-3.600.
Jansky, Louis S.: *See*—
Darbee, Paul V.; Ellis, Richard E.; Jansky, Louis S.; and Grossman, Avram S., 4,959,810, Cl. 364-900.000.
Janssen, Petrus C. H.: *See*—
van den Nieuwelaar, Adrianus J.; and Janssen, Petrus C. H., 4,958,694, Cl. 177-145.000.
Janssen, Sylvain; Fouinard, Claude; and Lagarde, Gerard, to Schlumberger Industries, S.A. Rotary device having inter-engaging internal and external teeth. 4,958,996, Cl. 418-152.000.
Janthur, Iago, to General Motors Corporation. Liquid cooling system for a supercharged internal combustion engine. 4,958,600, Cl. 123-41.310.
Japan Aviation Electronics Industry, Limited: *See*—
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.
Jaquins, Donald B. G.: *See*—
Axelrod, Robert J.; Jaquins, Donald B. G.; and Tyrell, John A., 4,959,481, Cl. 548-462.000.
Jarrell, Lamont R.: *See*—
Wolverton, Billy C.; and Jarrell, Lamont R., 4,959,084, Cl. 55-68.000.
Jarvis, Irene. Combined book cover book carrier. 4,958,759, Cl. 224-151.000.
Jaseck, James E.; and Fereshetian, Eric A., to Ford Motor Company. Moisture seal for a translatable pinion gear assembly in a starter motor. 4,958,530, Cl. 74-7.00A.
Jean Walterscheid GmbH: *See*—
Konrad, Mathias; and Weber, Wolfgang, 4,958,859, Cl. 285-39.000.
Jester, Willi: *See*—
von Haas, Rainer; and Jester, Willi, 4,958,968, Cl. 409-232.000.
Jinnouchi, Takeshi: *See*—
Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, 4,958,995, Cl. 418-152.000.
Joanino, Fernando A., to North American Philips Corporation. Two-lead igniter for HID lamps. 4,959,593, Cl. 315-290.000.
Job, Robert C., to Shell Oil Company. Silicate-modified magnesium ethoxide polymerization catalysts. 4,959,336, Cl. 502-107.000.
Johann, Gerhard: *See*—
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.
Johanson, Jerry R., to Jr Johanson, Inc. Modular mass-flow bin. 4,958,741, Cl. 220-83.000.
Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, to Minolta Camera Kabushiki Kaisha. Sheet storing apparatus for copying machine. 4,958,820, Cl. 270-52.000.
John Wyeth & Brothers Limited: *See*—
Ward, Terence J., 4,959,375, Cl. 514-323.000.
Johnsen, Oddvard. Method and a device for use in determining conditions of runway friction and braking. 4,958,512, Cl. 73-9.000.
Johnson, Brian A. Interval locator. 4,958,814, Cl. 269-43.000.
Johnson, Calvin S., to CTR Manufacturing, inc. Tree felling apparatus. 4,958,670, Cl. 144-34.00R.
Johnson, Earl W.: *See*—
Eke, Daniel A.; Eke, Alan B.; and Johnson, Earl W., 4,958,660, Cl. 137-625.230.
Johnson, Eric, to Quality Chain Corp. Connector for lateral cable of tire chains. 4,958,415, Cl. 24-69.0TT.
Johnson, Gerald A.: *See*—
Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.
Johnson, Harlan B.: *See*—
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., to General Electric Company. Process for reducing contamination of high temperature melts. 4,959,841, Cl. 373-10.000.
Johnson, Samuel V. Auxiliary tool handle. 4,958,407, Cl. 16-114.00R.
Jonand, Inc.: *See*—
Beiswenger, John L.; and Chelcun, Darrell N., 4,958,911, Cl. 350-331.00R.
Jonas, Friedrich; Heywang, Gerhard; Schmidtberg, Werner; Heinze, Jurgen; and Dietrich, Michael, to Bayer Aktiengesellschaft. Polythiophenes, process for their preparation and their use. 4,959,430, Cl. 526-257.000.
Jones, William C.: *See*—
Trundle, Mark H.; and Jones, William C., 4,959,192, Cl. 376-260.000.
Jons, Claus: *See*—
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, 4,958,994, Cl. 418-132.000.
Jorgens, Reinhard; and Faltermeier, Bernd, to Carl-Zeiss-Stiftung. Process and apparatus for the automatic focusing of microscopes. 4,958,920, Cl. 350-530.000.
Joseph, J. Michael: *See*—
Grieb, John H.; and Joseph, J. Michael, 4,958,430, Cl. 29-888.020.
Joshi, Rajendra K.: *See*—
Speiser, Peter P.; and Joshi, Rajendra K., 4,959,389, Cl. 514-494.000.
Josowicz, Mira; and Potje-Kamloth, Karin. Ultramicroelectrode, process for making same and its application. 4,959,130, Cl. 204-32.100.
Jr Johanson, Inc.: *See*—
Johanson, Jerry R., 4,958,741, Cl. 220-83.000.
JSS Scientific Corporation: *See*—
Stupakis, John S., 4,958,586, Cl. 114-297.000.
Ju, Shiaw: *See*—
Cozewith, Charles; Ju, Shiaw; and Verstrate, Gary W., 4,959,436, Cl. 526-348.000.
Juki Corporation: *See*—
Asaba, Yutaka; and Chikamura, Masaharu, 4,958,580, Cl. 112-314.000.

Jump, Janeice A.; and Hale, Thomas E. Microwave cooking assembly of a mixing bowl, lockable top assembly, supporting a stirrer power assembly. 4,959,517, Cl. 219-10.55E.
Jung, Rolf, to Krauss u. Reichert GmbH & Co. Laying machine. 4,958,819, Cl. 270-31.000.
Jungwirth, Dieter: *See*—
Herbst, Thomas; and Jungwirth, Dieter, 4,958,961, Cl. 405-260.000.
Jyoraku, Fumio: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Kabelmetal Electro GmbH: *See*—
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.
Kabivitrum AB: *See*—
Petho, Lajos, 4,958,649, Cl. 134-159.000.
Kabushiki Kaisha Kawai Gakki Seisakusho: *See*—
Kugimoto, Hidenori, 4,958,550, Cl. 84-454.000.
Kabushiki Kaisha Nihon Pipe Conveyor: *See*—
Hashimoto, Kunio, 4,958,724, Cl. 198-819.000.
Kabushiki Kaisha Toshiba: *See*—
Hasegawa, Michio; and Sahashi, Masashi, 4,959,631, Cl. 336-83.000.
Higashibata, Kouji; and Suzuki, Hironori, 4,959,348, Cl. 505-1.000.
Imai, Tadashi; and Okitu, Shinobu, 4,959,872, Cl. 455-164.000.
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, 4,959,816, Cl. 365-233.500.
Kobayashi, Hiroaki; and Hashimoto, Kenji, 4,958,722, Cl. 198-735.300.
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.
Maru, Kuniyoshi, 4,959,850, Cl. 379-58.000.
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, 4,958,716, Cl. 198-346.100.
Miyoshi, Akio, 4,959,780, Cl. 364-200.000.
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, 4,959,871, Cl. 382-59.000.
Ogura, Tsuneo; and Nakagawa, Akio, 4,959,703, Cl. 357-38.000.
Ootani, Takayuki, 4,959,560, Cl. 307-443.000.
Ootani, Takayuki, 4,959,562, Cl. 307-443.000.
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.
Suguro, Kyoichi, 4,959,745, Cl. 361-311.000.
Sukenobu, Satoru, 4,959,544, Cl. 250-305.000.
Suzuki, Yoshinori, 4,959,610, Cl. 324-309.000.
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.
Ueda, Katsunobu; and Sumiya, Mitsuo, 4,958,815, Cl. 269-58.000.
Yamada, Tetsuro, 4,959,651, Cl. 341-131.000.
Yamamoto, Motoyuki, 4,959,839, Cl. 372-46.000.
Kadle, Durgaprasad S., to General Motors Corporation. Heat exchanger with bypass channel louvered fins. 4,958,681, Cl. 165-151.000.
Kadono, Masaaki: *See*—
Miura, Tadashi; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.
Kagechika, Takashi: *See*—
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.
Kageyama, Yukihiko: *See*—
Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, 4,959,404, Cl. 524-267.000.
Kagoroku, Nobuo: *See*—
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotarou, 4,958,504, Cl. 62-244.000.
Kajiyama, Toshiki: *See*—
Yoneda, Kenzi; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
Kakiuchi, Toshihito: *See*—
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, 4,959,093, Cl. 71-88.000.
Kameda, Naomi; and Rowley, Gerald L., to Sclavo, Inc. Labeling design for a binding assay reagent. 4,959,306, Cl. 435-7.000.
Kameda, Toshihiro: *See*—
Aoi, Tomio; and Kameda, Toshihiro, 4,958,984, Cl. 415-55.100.
Kamecoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, to Matsushita Electric Industrial Co., Ltd. Wide bond balanced output frequency modulator using a video signal as a modulation signal. 4,959,625, Cl. 332-135.000.
Kamiya, Shuji: *See*—
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, to Fujisawa Pharmaceutical Co., Ltd. (22R,23R,24S)-22,23-epoxy-2α3α-isopropylidenedioxy-B-homo-7-oxa-5α-stigmastan-6-one and plant growth regulating method containig the same. 4,959,093, Cl. 71-88.000.
Kanai, Masahiro: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.
Kanayama, Toshio: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, to Hitachi Maxell, Ltd.; and Hitachi, Ltd. Shutter assembled disc cartridge. 4,959,744, Cl. 360-133.000.
Kanebo Ltd.: *See*—
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.
Kaneko, Kiyotaka: *See*—
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.
Kaneko, Shuzo: *See*—
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.
Kaneko, Tamaki, to Ricoh Company, Ltd. Sheet ejector. 4,958,827, Cl. 271-176.000.
Kaneniwa, Tatsuya: *See*—
Hung, Po-Chieh; and Kaneniwa, Tatsuya, 4,959,711, Cl. 358-80.000.
Kanesaka, Junichiro: *See*—
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.
Kaneshige, Yosuke: *See*—
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.
Kanno, Masahide: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.
Kanou, Yoshiaki: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
Kanzawa, Noboru: *See*—
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
KAO Corporation: *See*—
Noguera, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, 4,959,206, Cl. 424-70.000.
Ohnuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.
Kaplinsky, George, to Hewlett-Packard Company. Refillable ink bag. 4,959,667, Cl. 346-140.00R.
Kappernaros, James. Air conditioning system filter with variable rate scent release. 4,959,087, Cl. 55-279.000.
Karbowski, Robert J., to Dow Chemical Company, The. Wastewater disinfection with a combination of biocides. 4,959,157, Cl. 210-752.000.
Kardas, Alan, to Institute of Gas Technology. Portable, flueless, low nox, low co space heater. 4,958,619, Cl. 126-85.00R.
Karl Kassbohrer Fahrzeugwerke GmbH: *See*—
Kauer, Kurt, 4,958,576, Cl. 108-35.000.
Karmarkar, Subhash D.: *See*—
Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., 4,958,763, Cl. 228-193.000.
Karolia, Seraj A. M.: *See*—
Farrar, David; Benn, Gerald P.; and Karolia, Seraj A. M., 4,959,502, Cl. 564-127.000.
Kashiwagi, Eiji: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
Kashiwagi, Masayuki; and Matsumoto, Takashi, to Nissin High Voltage Co., Ltd. Automatic exchanger of an electron beam irradiator for window foil. 4,959,550, Cl. 250-492.300.
Kassai, Kenzou, to Aprica Kassai Kabushikikaisha. High chair. 4,958,885, Cl. 297-55.000.
Kastl, Alfons: *See*—
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.
Kato, Akio, to Minolta Camera Kabushiki Kaisha. Image forming apparatus provided with a sheet storing unit. 4,959,685, Cl. 355-72.000.
Kato, Akira; and Yano, Toru, to Honda Giken Kogyo K.K. Air-fuel ratio control method for internal combustion engines. 4,958,612, Cl. 123-489.000.
Kato, Hideo: *See*—
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, 4,959,816, Cl. 365-233.500.
Kato, Kozi: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Kato, Yoshinori: *See*—
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.

Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, to Ricoh Company, Ltd. Bias power source controller for an image forming apparatus. 4,959,687, Cl. 355-214.000.

Katoh, Hiroshi: *See*—
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

Katsuki, Shinji: *See*—
Fujii, Hiroshi; and Katsuki, Shinji, 4,959,738, Cl. 360-78.130.

Katsura, Yutaka: *See*—
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

Katz, Ira: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.

Kauer, Kurt, to Karl Kassbohrer Fahrzeugwerke GmbH. Fold-away table. 4,958,576, Cl. 108-35.000.

Kaufmann, Herbert: *See*—
Prokopp, Manfred; and Kaufmann, Herbert, 4,959,609, Cl. 324-158.00F.

Kawabata, Katsuhiko: *See*—
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.

Kawagishi, Hideyuki: *See*—
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.

Kawahara, Hideo: *See*—
Takahashi, Koji; Koruki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.

Kawai, Hisashi, to Canon Kabushiki Kaisha. Recording apparatus with remaining time indication display. 4,959,735, Cl. 358-342.000.

Kawai, Masahiko: *See*—
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.

Kawamura, Hideaki; Fujibayashi, Kentaro; and Otsuki, Toshiaki, to Fanuc Ltd. Numerical control apparatus. 4,959,597, Cl. 318-568.150.

Kawamura, Hideaki: *See*—
Sasaki, Takashi; Sakurada, Nobuaki; and Kawamura, Hideaki, 4,959,659, Cl. 346-1.100.

Kawamura, Hideo, to Isuzu Ceramics Research Institute Co., Ltd. Drive system for turbochargers with rotary electric machines. 4,958,497, Cl. 60-608.000.

Kawamura, Hideo, to Isuzu Motors Limited. Drive system for turbocharger with rotary electric machine. 4,958,708, Cl. 192-0.098.

Kawamura, Takashi: *See*—
Yamada, Seiki; and Kawamura, Takashi, 4,959,553, Cl. 250-560.000.

Kawamura, Toshiaki: *See*—
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, 4,959,778, Cl. 364-200.000.

Kawamura, Yuzo; and Nakagawa, Sigeo, to Yugenkaisha Idearesearch; and Matsuo Sangyo Co., Ltd. Method for producing reinforced block material of metal or the like. 4,958,678, Cl. 164-461.000.

Kawasaki Steel Corporation: *See*—
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.

Kawashima, Saburo: *See*—
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Kay, Malcolm J.; and Tracy, Philip A., to U.S. Philips Corporation. Circuit arrangement for detecting cross-over by an alternating voltage of a fixed reference voltage level. 4,959,558, Cl. 307-354.000.

Kearney, Mark B., to Delco Electronics Corporation. Operational amplifier with precise bias current control. 4,959,622, Cl. 330-257.000.

Kearney-National, Inc.: *See*—
Luetzow, Robert H., 4,959,629, Cl. 335-228.000.

Keegan, Robert R.: *See*—
Thompson, Richard A., 4,958,383, Cl. 2-150.000.

Keen, Cletus F. Garment hanger caddy cart. 4,958,841, Cl. 280-47.350.

Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, to McDonnell Douglas Corporation. Optical measuring apparatus. 4,958,932, Cl. 356-383.000.

Keilhauer, Gerhard: *See*—
Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Schairer, Angela, 4,959,484, Cl. 549-334.000.

Keiper, Winfried: *See*—
Bruggen, Gerhard; Keiper, Winfried; and Steinke, Leo, 4,958,515, Cl. 73-116.000.

Keller, Christian: *See*—
Neuffer, Ingemar; and Keller, Christian, 4,959,808, Cl. 364-566.000.

Kemp, James H.: *See*—
Curtis, John P.; and Kemp, James H., 4,958,751, Cl. 222-192.000.

Kempkers, Gordon, to Prince Corporation. Headliner with integral visor. 4,958,878, Cl. 296-97.500.

Kennametal Inc.: *See*—
Mehrotra, Pankaj K.; and Billman, Elizabeth R., 4,959,331, Cl. 501-89.000.
Mehrotra, Pankaj K.; and Billman, Elizabeth R., 4,959,332, Cl. 501-89.000.

Kennedy, Lawrence C., to General Motors Corporation. Integrally formed wiper and orifice for a pump plate of a viscous fluid clutch. 4,958,709, Cl. 192-58.00B.

Kennedy, Richard A.: *See*—
Maalove, Gregory J.; Marrah, Jeffrey J.; and Kennedy, Richard A., 4,959,859, Cl. 381-10.000.

Kennedy, Todd R.: *See*—
Disco, Joseph; and Kennedy, Todd R., 4,958,876, Cl. 296-39.200.

Kentek Informatio Systems, Inc.: *See*—
Fukae, Kensuke, 4,959,731, Cl. 358-300.000.

Keoshkerian, Barkev: *See*—
Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppa; and Murti, Dasarao K., 4,959,288, Cl. 430-59.000.

Kermici, Michel: *See*—
Brod, Joel; and Kermici, Michel, 4,959,213, Cl. 514-21.000.

Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., to AT&T Information Systems Inc. Telephone answering machine having solid state and magnetic tape storage for outgoing announcements. 4,959,852, Cl. 379-70.000.

Kerr, John B.: *See*—
Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., 4,959,135, Cl. 204-129.000.

Ketterer, Hans: *See*—
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, 4,958,666, Cl. 141-114.000.

Khalafalla, Sanaa E.: *See*—
Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.

Khan, M. M. Taqui; and Siddiqui, M. R. Hussain, to Council of Scientific & Industrial Research. Process for the preparation of clay loaded metal complexes catalyst and a process for the hydrogenation of oils using the catalyst so prepared. 4,959,335, Cl. 502-62.000.

Khoury, John M., to AT&T Bell Laboratories. Low impedance buffer circuit. 4,959,623, Cl. 330-265.000.

Khowles, Carl H., to Metrologic Instruments, Inc. Bouncing oscillating scanning device for laser scanning apparatus. 4,958,894, Cl. 350-6.600.

Khri-Yakub, Butrus T.; Elrod, Scott A.; and Quate, Calvin F., to Xerox Corporation. Acoustic ink printhead having reflection coating for improved ink drop ejection control. 4,959,674, Cl. 346-140.00R.

Kickle, Hunter L.: *See*—
Ravi, Prasad S.; Kickle, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., 4,959,468, Cl. 536-127.000.

Kidd, Thomas F., to Electrovert Ltd. Method for casting metal alloys with low melting temperatures. 4,958,675, Cl. 164-120.000.

Kiesewetter, Erwin O.: *See*—
Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gerriet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seippl, Ulrich G. P., 4,959,391, Cl. 514-546.000.

Kievsky Politekhnichesky Institut Imeni: *See*—
Vishnevsky, Vladimir S.; and Lavrinenko, Vyacheslav V., 4,959,580, Cl. 310-323.000.

Kikuchi, Kazuto, to Sanden Corporation. Scroll type compressor with discharge through drive shaft. 4,958,991, Cl. 418-55.600.

Kikugawa, Noriyuki, to Canon Kabushiki Kaisha. Driving device for a stepping motor. 4,959,601, Cl. 318-696.000.

Kim, Sam H. Box-cording apparatus. 4,958,481, Cl. 53-592.000.

Kim, Sang-Sup. Stationary exercising bicycle apparatus. 4,958,831, Cl. 272-73.000.

Kim, Sang-Sup. Stationary exercising bicycle apparatus. 4,958,832, Cl. 272-73.000.

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Fischer, Roy; and Fair, Paul F., 4,958,864, Cl. 292-19.000.

Kimoto, Tetsuya; and Nakagawa, Masashi, to Matsushita Electric Works, Ltd. Method and apparatus for inspecting transparent containers. 4,959,537, Cl. 250-223.00B.

Kimura, Hiroshi: *See*—
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.

Kimura, Masaki: *See*—
Shibata, Toshihiro; Kurosawa, Norio; and Kimura, Masaki, 4,959,173, Cl. 252-299.650.

Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, to Matsushita Electric Industrial Co., Ltd. Film capacitor, method of and apparatus for manufacturing the same. 4,959,748, Cl. 361-323.000.

Kimura, Tomoaki, to Hitachi, Ltd. Rolling installation for and rolling method of continuous cast strip. 4,958,677, Cl. 164-452.000.

Kimura, Yasuo: *See*—
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, 4,959,529, Cl. 219-388.000.

King, Francis D., to Beecham Group P.L.C. 4-oxo-1,2,3-benzotriazines. 4,959,367, Cl. 514-243.000.

King, Gerard: *See*—
Flynn, Stephen J.; and King, Gerard, 4,959,873, Cl. 455-303.000.

Kingsley Nominees Pty. Ltd.: *See*—
Bayly, Peter K., 4,958,744, Cl. 220-305.000.

Kinney, John H., Jr.: *See*—
Breeden, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.

Kinoshita, Keichi: *See*—
Jotsai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.

Kinugasa, Toshiro: *See*—
Imaide, Takuya; and Kinugasa, Toshiro, 4,959,727, Cl. 358-228.000.
Kioritz Corporation: *See*—
Masuda, Isao; Taomo, Toshio; and Sasaki, Fujio, 4,958,745, Cl. 220-375.000.
Kipling, Kent K.: *See*—
Hoegler, Leonard E.; Johnson, Gerald A.; Essock, Diana M.; and Kipling, Kent K., 4,959,585, Cl. 313-271.000.
Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., to General Motors Corporation. Temperature sender connector cover and terminal. 4,959,633, Cl. 338-22.00R.
Kirin Beer Kabushiki Kaisha: *See*—
Nakajima, Shohachi; and Komeshima, Nobuyasu, 4,959,460, Cl. 536-6.400.
Kirisawa, Ryouhei: *See*—
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.
Kirschner, Jochem, to General Motors Corporation. Method for steering a motor vehicle. 4,958,698, Cl. 180-140.000.
Kiss, Endrene : *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
Kita, Masahiro: *See*—
Nishimura, Katsuhiko; Shinho, Kazuyuki; and Kita, Masahiro, 4,959,695, Cl. 355-327.000.
Kitahara, Takumi: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Kitoh, Shinya: *See*—
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.
Kivimaa, Antti; and Perala, Reijo, to Oy Helo-Tehtaat-Helo Factories, Ltd. Electric sauna heater. 4,959,527, Cl. 219-365.000.
Kiyohara, Toshimi; and Morita, Toshiya, to Sharp Kabushiki Kaisha. Display control system. 4,959,803, Cl. 364-521.000.
Kiyokawa, Tetsushi: *See*—
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
Klebl, Wolfram: *See*—
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.
Klein, Joseph T.: *See*—
Allen, Richard C.; Klein, Joseph T.; and Effland, Richard C., 4,959,370, Cl. 514-352.000.
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.
Kleiner, Hans-Jerg: *See*—
Engelhardt, Friedrich; Riegel, Ulrich; Gersdorf, Joachim; and Kleiner, Hans-Jerg, 4,959,441, Cl. 558-161.000.
Kleinewefers GmbH: *See*—
Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, 4,958,478, Cl. 53-415.000.
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, to Nabisco Brands, Inc. Low calorie fat mimetics. 4,959,465, Cl. 536-115.000.
Kleppe, Mari A.: *See*—
Nadland, Karl J.; and Kleppe, Mari A., 4,959,222, Cl. 424-692.000.
Kleschick, William A.: *See*—
Pearson, Norman R.; Kleschick, William A.; and Carson, Chrislyn M., 4,959,473, Cl. 544-263.000.
Kline, John F.: *See*—
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,563, Cl. 101-458.000.
Klingman, Kenneth C.: *See*—
Rubinstein, Jon; and Klingman, Kenneth C., 4,959,781, Cl. 364-200.000.
Klinke, Roland: *See*—
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, 4,959,621, Cl. 330-253.000.
Klinker, Walter: *See*—
Leiber, Heinz; Klinker, Walter; and Meier, Gerhard, 4,958,704, Cl. 188-285.000.
Kloettschen, Hermann: *See*—
Hourticolon, Roland; and Kloettschen, Hermann, 4,958,719, Cl. 198-635.000.
Klomp, Edward D., to General Motors Corporation. Injection nozzle. 4,958,771, Cl. 239-453.000.
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthoid, to Chrysler Corporation. Multi-pinion differential assembly. 4,959,043, Cl. 475-230.000.
Klotz, Manfred: *See*—
Haefner, Hans-Ulrich; Klotz, Manfred; and Strasser, Wilhelm, 4,958,499, Cl. 62-55.500.
Knaak, Joachim, to Interatom GmbH. Apparatus for measuring the flow rate of electrically conductive liquids. 4,958,523, Cl. 73-861.110.
Knecht, Mark W.; and Frake, Scott O., to National Semiconductor Corporation. Output buffer with ground bounce control. 4,959,565, Cl. 307-542.000.
Knobbe, Martens, Olson & Bear: *See*—
McIver, Robert T., Jr.; and Hunter, Richard L., 4,959,543, Cl. 250-291.000.
Knoerr, Susan B.; and Robins, Robert G., to Cominco Ltd. Preparation of copper arsenate. 4,959,203, Cl. 423-602.000.
Kobashikawa, Akira: *See*—
Hatori, Nobuyoshi; Iwamoto, Tamio; and Kobashikawa, Akira, 4,959,689, Cl. 355-233.000.
Kobayashi, Hidetoshi: *See*—
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.
Kobayashi, Hiroaki; and Hashimoto, Kenji, to Kabushiki Kaisha Toshiba. Transfer apparatus for lead frame. 4,958,722, Cl. 198-735.300.
Kobayashi, Hiroaki: *See*—
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.
Kobayashi, Hisashi: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Kobayashi, Takashi: *See*—
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsuhi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
Kobayashi, Tohru, to Canon Kabushiki Kaisha. Ink jet recorder having means for removing unused ink from ink discharge orifice and for capping same. 4,959,662, Cl. 346-1.100.
Kobayashi, Toshiaki: *See*—
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.
Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, to Mitsubishi Denki Kabushiki Kaisha. Forming homogeneous precursers of Bi-Sr-Ca-Cu via carboxylates in the presence of oxidizing agents. 4,959,347, Cl. 505-1.000.
Kobayashi, Toshiyuki: *See*—
Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.
Kobayashi, Yousuke; and Fukazawa, Keiichi, to Mitsubishi Denki Kabushiki Kaisha. Paper feeder for printer. 4,958,950, Cl. 400-629.000.
Koboshi, Shigeharu: *See*—
Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.
Koch Industries, Inc.: *See*—
Raneri, Joseph J., 4,959,149, Cl. 210-636.000.
Koch, Mark A., to Raven Industries, Inc. Inflatable decelerator. 4,958,565, Cl. 102-386.000.
Kochi, Masahanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, to Hitachi, Ltd. Jitter reducing tapered rotary drum for magnetic head apparatus. 4,959,743, Cl. 360-130.240.
Kocourek, Franz; Ketterer, Hans; Kastl, Alfons; and Loistl, Rudolf, to Agfa-Gevaert Aktiengesellschaft. Storage canister for process liquids for use in an apparatus for wet processing of photographic material. 4,958,666, Cl. 141-114.000.
Koelpin, Thomas, to Siemens Aktiengesellschaft. Circuit arrangement for current limiting. 4,959,747, Cl. 361-31.000.
Koenig & Bauer Aktiengesellschaft: *See*—
Grosshauser, Heinrich K.; Kutzner, Willi A. P.; and Schneider, Georg, 4,958,561, Cl. 101-363.000.
Hauer, Horst-Walter; and Hauer, Gerda E., 4,958,525, Cl. 073-862.480.
Kogane, Mikio: *See*—
Otake, Katsumi; Sakamoto, Kiichiro; and Kogane, Mikio, 4,959,683, Cl. 355-28.000.
Koh, Chang-Am. Doll assembled of prefabricated weave sections of rush stalks. 4,959,036, Cl. 446-385.000.
Koharagi, Haruo: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Kohler, James L., to Delco Electronics Corporation. Automotive instrument display having a thickfilm electroluminescent lightpipe pointer. 4,959,759, Cl. 362-80.000.
Kohno, Hideki: *See*—
Yamamoto, Etsuji; and Kohno, Hideki, 4,959,613, Cl. 324-318.000.
Kohno, Masahito; and Nakamura, Yoshiyuki, to Koyo Seiko Co., Ltd. Tilt steering device. 4,958,852, Cl. 280-775.000.
Koitabashi, Noribumi, to Canon Kabushiki Kaisha. Image forming apparatus having charging and discharging means. 4,959,688, Cl. 355-219.000.
Koizumi, Hisao: *See*—
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.
Kojima, Makoto: *See*—
Inaba, Yutaka; Kawagishi, Hideyuki; Kojima, Makoto; and Kaneko, Shuzo, 4,958,912, Cl. 350-333.000.

Kojima, Toshikuni: *See*—
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Kojima, Toshio, to Osada Research Institute, Ltd. Spinal needle with optical fiber means for radiating a laser beam. 4,959,063, Cl. 606-15.000.

Kokusan Denki Company, Ltd.: *See*—
Saito, Akihiko; and Yukawa, Hideki, 4,958,608, Cl. 123-427.000.

Kolb, Eugen, to Dr. Ing. h.c.F. Porsche Aktiengesellschaft. Folding top for vehicles. 4,958,882, Cl. 296-108.000.

Komeshima, Nobuyasu: *See*—
Nakajima, Shohachi; and Komeshima, Nobuyasu, 4,959,460, Cl. 536-6.400.

Komiya, Ryohei: *See*—
Yamamoto, Takemi; Komiya, Ryohei; Hatta, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiro, 4,959,682, Cl. 355-27.000.

Komorita, Hiroshi: *See*—
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.

Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, to Hitachi Ltd.; and Hitachi Microcomputer Engineering. Data processing system employing two address translators, allowing rapid access to main storage by input-/output units. 4,959,770, Cl. 364-200.000.

Kondo, Michio, to Brother Kogyo Kabushiki Kaisha. Optical fiber sensor. 4,958,929, Cl. 356-345.000.

Koniarek, Jan P.: *See*—
Fischbarg, Jorge; Liebovitch, Larry S.; and Koniarek, Jan P., 4,959,355, Cl. 514-23.000.

Konica Corporation: *See*—
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 4,959,669, Cl. 346-157.000.
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Toura, Kosuke, 4,959,796, Cl. 364-497.000.
Hung, Po-Chieh; and Kaneniwa, Tatsuya, 4,959,711, Cl. 358-80.000.
Kosugi, Akira; and Hanada, Kouichi, 4,958,821, Cl. 271-3.100.
Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.
Nishijima, Toyoki; and Onodera, Kaoru, 4,959,300, Cl. 430-546.000.

Konotsune, Shiro: *See*—
Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, 4,959,437, Cl. 528-26.000.

Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG: *See*—
Meindl, Bernd, 4,958,574, Cl. 104-88.000.

Konrad, Mathias; and Weber, Wolfgang, to Jean Walterscheid GmbH. Pre-assembly muff for the cutting or clamping ring of a pipe coupling. 4,958,859, Cl. 285-39.000.

Korach, Malcolm: *See*—
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.

Kormendy, Agoston: *See*—
Toth, Laszlo P.; Kiss, Endrese ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Kos, Antonides: *See*—
Dijkstra, Reinder; and Kos, Antonides, 4,959,462, Cl. 536-27.000.

Koster, Chester A. Oil spill recovery vessel. 4,959,143, Cl. 210-242.300.

Kosugi, Akira; and Hanada, Kouichi, to Konica Corporation. Recording sheet stacking apparatus in image recording system. 4,958,821, Cl. 271-3.100.

Kotter, Rodman W. Adaptive architectural cover panel system. 4,958,476, Cl. 52-745.000.

Koves, William J., to UOP. Downwardly forced particle bed for gas contacting. 4,959,198, Cl. 422-220.000.

Koya, Eitaro: *See*—
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.

Koyama, Takeshi: *See*—
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohmuki, Ichiro, 4,959,677, Cl. 354-402.000.

Koyo Seiko Co., Ltd.: *See*—
Kohno, Masahito; and Nakamura, Yoshiyuki, 4,958,852, Cl. 280-775.000.
Shimizu, Shiro, 4,958,942, Cl. 384-486.000.

Kozai, Masafumi: *See*—
Yoshioka, Masanori; and Kozai, Masafumi, 4,959,191, Cl. 264-529.000.

Kozhanov, Evgeny V.: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Kozlowskyj, Wasil: *See*—
Allaire, Jacky; and Kozlowskyj, Wasil, 4,958,507, Cl. 66-19.000.

Kozuki, Susumi: *See*—
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.

Kraft General Foods, Inc.: *See*—
Wyss, Clement R.; McGuire, Michael T.; and Frost, John R., 4,959,230, Cl. 426-102.000.

Kraft, William G.; and Morgan, Donna R., to Norwich Eaton Pharmaceuticals, Inc. Use of nitrofurantoin for the treatment and prophylaxis of gastrointestinal disorders. 4,959,384, Cl. 514-390.000.

Krakowiak, Krzysztof E.: *See*—
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.

Krause, Hans J.: *See*—
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

Krauss u. Reichert GmbH & Co.: *See*—
Jung, Rolf, 4,958,819, Cl. 270-31.000.

Krebs, John L.: *See*—
Wallick, Claude R., Jr.; Schmitt, Thomas J.; Bogart, Bruce E.; and Krebs, John L., 4,959,107, Cl. 148-13.000.

Kreinberg, Earl R., to AMP Incorporated. Power distribution adapter. 4,959,026, Cl. 439-651.000.

Krietzman, William D.: *See*—
Smith, Terry L.; and Krietzman, William D., 4,958,427, Cl. 27-566.400.

Kristan, Louis L. Remotely operated submersible underwater suction apparatus. 4,959,146, Cl. 210-237.000.

Kroutil, Joseph C.: *See*—
Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, 4,958,932, Cl. 356-383.000.

Kruck, Richard W.; and Cur, Omer N., to Whirlpool Corporation. Heavy gas-filled multilayer insulation panels and method of manufacture thereof. 4,959,111, Cl. 156-145.000.

Kruger, Martin: *See*—
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.

Krupp Widia GmbH: *See*—
von Haas, Rainer; and Jester, Willi, 4,958,968, Cl. 409-232.000.

Kubo, Nobuhiko, to Yamashita Denso Corporation. Method of adjusting light source position in convergence device employing spheroidal mirror. 4,958,909, Cl. 350-320.000.

Kuderer, Hubert, to Hewlett-Packard Company. Photodiode array spectrometer. 4,958,928, Cl. 356-328.000.

Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, to Matsushita Electric Industrial Co., Ltd. Solid electrolytic capacitor and method of manufacturing the same. 4,959,753, Cl. 361-525.000.

Kuenzel, Werner; and Vierkoetter, Peter, to Henkel Kommanditgesellschaft auf Aktien. Appliance for simultaneously dispensing both free-flowing and pourable substances. 4,958,749, Cl. 222-133.000.

Kugimoto, Hidenori, to Kabushiki Kaisha Kawai Gakki Seisakusho. Tuning method and apparatus for keyboard musical instrument. 4,958,550, Cl. 84-454.000.

Kugler, Stanley: *See*—
Schwartz, Bradley N.; Kugler, Stanley; and Selg, Donald W., 4,958,938, Cl. 374-208.000.

Kuhbauch, Gerd, to Robert Bosch GmbH. Wiper device for a curved windshield of a vehicle. 4,958,405, Cl. 15-250.330.

Kuhla, Donald E.: *See*—
Youssefyeh, Raymond D.; Campbell, Henry F.; and Kuhla, Donald E., 4,959,485, Cl. 549-461.000.

Kuhn, Herbert: *See*—
Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, 4,959,478, Cl. 546-319.000.

Kukes, Simon G.; Gutberlet, Louis C.; and Hensley, Albert L., to Amoco Corporation. Two-catalyst hydrocracking process. 4,959,140, Cl. 208-59.000.

Kulpa, Walter J.: *See*—
Dannatt, Hugh S.; Alesi, Thomas W., Jr.; and Kulpa, Walter J., 4,958,782, Cl. 242-75.430.

Kumar, Rajendra, to United States of America, National Aeronautics and Space Administration. Efficient detection and signal parameter estimation with application to high dynamic GPS receiver. 4,959,656, Cl. 342-418.000.

Kumasaka, Takao: *See*—
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.

Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, to National Federation of Agricultural Co-Operative Associations; and Nissan Chemical Industries. Method for increasing the yield of crops. 4,959,091, Cl. 71-77.000.

Kung, Patrick C.; and Goldstein, Gideon, to Ortho Pharmaceutical Corporation. Hybrid cell line for producing monoclonal antibody to a human monocyte antigen, antibody, and methods. 4,959,458, Cl. 530-387.000.

Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, to Eisai Co., Ltd. 1,4-benzodioxane derivatives. 4,959,376, Cl. 514-338.000.

Kunimune, Kouichi; Kutsuzawa, Yoshiya; and Konotsune, Shiro, to Chisso Corporation. Process for producing a low thermally expansive and highly adhesive silicon-containing polyimide and a precursor thereof. 4,959,437, Cl. 528-26.000.

Kunishi, Noriyuki: *See*—
Ashida, Takashi; Kunishi, Noriyuki; and Yamamoto, Koji, 4,959,456, Cl. 528-371.000.

Kuntz, Robert J., to Hubbell Incorporated. Die casting apparatus for casting articles with an internally threaded bore. 4,958,676, Cl. 164-340.000.

Kunz, Walter: *See*—
Zondler, Helmut; and Kunz, Walter, 4,959,096, Cl. 514-356.000.
Kupperman, David S.; Majumdar, Saurindranath; Faber, John F., Jr.; and Singh, J. P., to United States of America, Energy. Neutron apparatus for measuring strain in composites. 4,959,548, Cl. 250-390.090.
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, to Chubu Electric Power Company, Inc.; and Kabushiki Kaisha Toshiba. Storage type electric water heater having a closed circulation loop with a bubble pump. 4,959,526, Cl. 219-314.000.
Kuranuki, Kenji: *See*—
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.
Kurasay Company, Ltd.: *See*—
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, 4,959,393, Cl. 514-724.000.
Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
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Ogawa, Koji; and Machida, Hikoichi, 4,958,786, Cl. 244-17.130.
MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., to General Electric Company. Switched reluctance motor drive system and laundering apparatus employing same. 4,959,596, Cl. 318-254.000.
MacNeal, James R.; Rack, Timothy P.; and Corns, Ronald R., to AGA AB. Process for degassing aluminum melts with sulfur hexafluoride. 4,959,101, Cl. 75-685.000.
Macpherson, Roger. Variable positive drive transmission. 4,958,533, Cl. 74-333.000.
Madden, James J., III, to Ballston Knitting Company, Inc. Socks with size indicating stripes. 4,958,388, Cl. 2-239.000.
Maeda, Katsumi: *See*—
Hayashi, Yuji; Sakakibara, Susumu; and Maeda, Katsumi, 4,959,692, Cl. 355-253.000.
Maerte, Leo; and Wolter, Michael, to Erich Pfeiffer GmbH & Co. KG. Invention Bump for liquid media. 4,958,752, Cl. 222-321.000.
Magnashield Technologies, Inc.: *See*—
Yarger, Eric J.; Yarger, Rex D.; and Clegg, Gary D., 4,959,504, Cl. 174-35.0MS.
Magruder, Judy A.: *See*—
Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,959,218, Cl. 424-473.000.
Maher, Anthony J., to Detection Systems Pty. Ltd. Search head for metal detectors. 4,959,636, Cl. 340-568.000.
Mai, Khuong H. X.: *See*—
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,959,390, Cl. 514-522.000.
Majaniemi, Pekka: *See*—
Rautakorpi, Paavo; Lehtinen, Jukka; and Majaniemi, Pekka, 4,958,444, Cl. 34-71.000.
Majumdar, Saurindranath: *See*—
Kupperman, David S.; Majumdar, Saurindranath; Faber, John F., Jr.; and Singh, J. P., 4,959,548, Cl. 250-390.090.
Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, to Honda Giken Kogyo Kabushiki Kaisha. Method of controlling clutch operation for a vehicle and method of determining clutch engagement completion. 4,958,492, Cl. 60-327.000.
Maki, Kazuya; and Yamaguchi, Kouji, to Honda Giken Kogyo Kabushiki Kaisha. Controller for continuously variable speed transmission. 4,958,494, Cl. 60-468.000.
Makino, Kazumasa: *See*—
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.
Malloy, John R. Electrically heated vessel and base unit for use in a motor vehicle. 4,959,528, Cl. 219-432.000.
Malter, Ugo: *See*—
Truzzi, Sergio; Oldani, Emilio; and Malter, Ugo, 4,958,614, Cl. 123-585.000.
Man Roland Druckmaschine AG: *See*—
Fuhrmann, Hartmut; and Plaschka, Reinhard, 4,958,564, Cl. 101-467.000.
MAN Technologie GmbH: *See*—
Hirt, Alfred, 4,959,668, Cl. 346-155.000.
Mancini, Flavio, to Danieli & C. Officine Meccaniche S.p.A.; and ITI/CLM Impianti Tecnici Industriali S.p.A. Rehabilitation machine having its feed and discharge of materials at its leading end in the direction of its advance. 4,958,573, Cl. 104-2.000.
Manderfield, Thomas H.: *See*—
Henderson, Mark F.; and Manderfield, Thomas H., 4,959,708, Cl. 357-84.000.
Mandigo, Frank N., to Olin Corporation. Wrought copper alloy-shaped charge liner. 4,958,569, Cl. 102-476.000.
Mandle, Gary, to Sony Corporation. Method and apparatus for processing camera an image produced by a video camera to correct for undesired motion of the video camera. 4,959,725, Cl. 358-222.000.
Maness, Darren K.: *See*—
Gold, Thomas P.; Hamberg, James P.; Maness, Darren K.; and Muzechuk, Richard A., 4,958,810, Cl. 267-140.100.
Mangler, Robert J.; Marsland, Anne J.; Podd, George O.; and Schweizer, Russell, to Wilson Jones Company. Multidocument holder with articulating line guide. 4,958,453, Cl. 40-352.000.
Maniar, Gunvant N., to Carpenter Technology Corporation. Magnetically biased device incorporating a free machining, non-magnetic, austenitic stainless steel. 4,959,513, Cl. 200-61.45M.
Manlove, Gregory J.; Marrah, Jeffrey J.; and Kennedy, Richard A., to Delco Electronics Corporation. FM Channel separation adjustment. 4,959,859, Cl. 381-10.000.
Mann, Samuel J., to Inverness Corporation. Hot wax hair remover apparatus. 4,958,951, Cl. 401-1.000.
Mannesmann AG: *See*—
Bonifer, Edgar; Duttine, Walter; and Reckemeier, Hartwig, 4,958,723, Cl. 198-781.000.
Mannesmann Rexroth GmbH: *See*—
Dantlgraber, Jorg, 4,959,581, Cl. 310-328.000.
Mano, Eiichi: *See*—
Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,959,469, Cl. 540-222.000.
Mao, Simon J. T.: *See*—
Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., 4,959,392, Cl. 514-712.000.
Marangone, Nereo: *See*—
Colli, Luici; Badiali, Roberto; and Marangone, Nereo, 4,958,779, Cl. 242-035.60R.

Marcerou, Jean-Francois: *See*—
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.
Marcon Electronics Company, Ltd.: *See*—
Hirama, Eiichi, 4,959,652, Cl. 361-310.000.
Marconi Company Limited, The: *See*—
Flynn, Stephen J.; and King, Gerard, 4,959,873, Cl. 455-303.000.
Marcus, Leon, to General Motors Corporation. Method and apparatus for wear testing anodized surfaces. 4,958,511, Cl. 73-7.000.
Mares, Gyula: *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyorgy; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
Marino, Philip F., to Eastman Kodak Company. Alignment sensing and correcting assembly for an optical element. 4,959,531, Cl. 250-201.900.
Mark, David F.; Lin, Leo S.; Yu Lu, Shi-da; and Wang, Alice M., to Cetus Corporation. Cysteine-depleted muteins of biologically active proteins. 4,959,314, Cl. 435-69.100.
Marketing Displays, Inc.: *See*—
Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., 4,958,458, Cl. 40-156.000.
Markow, Paul A.; and Nolle, William, to Acustar, Inc. Winding machine for woven crossed-coil air core gauge. 4,958,777, Cl. 242-7.110.
Markowski, Robert G.: *See*—
Roburge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.
Maron, Robert, to Teleco Oilfield Services Inc. Apparatus for measuring weight, torque and side force on a drill bit. 4,958,517, Cl. 73-151.000.
Marquee Foods, Incorporated: *See*—
Lakey, Robert B.; and Graham, N. Bruce, 4,959,231, Cl. 426-111.000.
Marrah, Jeffrey J.: *See*—
Manlove, Gregory J.; Marrah, Jeffrey J.; and Kennedy, Richard A., 4,959,859, Cl. 381-10.000.
Marrow, Brett; and Harris, Jim. Power driven golf hole cutting apparatus. 4,958,688, Cl. 172-22.000.
Mars GB Ltd.: *See*—
Hall, Simon R.; and Wills, Garry D., 4,959,238, Cl. 426-447.000.
Marschner, Charles F. Holding device and shearing device used in concert for hand held shearing of thin-wall tubes. 4,958,434, Cl. 30-101.000.
Marshall, Willie J. Rotary hair trimmer. 4,958,432, Cl. 30-29.500.
Marsland, Anne J.: *See*—
Mangler, Robert J.; Marsland, Anne J.; Podd, George O.; and Schweizer, Russell, 4,958,453, Cl. 40-352.000.
Martel, Bernard: *See*—
Le Mer, Joseph; and Martel, Bernard, 4,958,765, Cl. 236-20.00R.
Martel, Yvan, to Canada, Her Majesty the Queen in Right of, as represented by the Minister of National Defence of Her Majesty's Canadian Government. Non-ricocheting projectile and method of making same. 4,958,572, Cl. 102-529.000.
Martin, Berthold: *See*—
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, 4,959,043, Cl. 475-230.000.
Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., 4,958,753, Cl. 192-85.0AA.
Martin, Frederick L., to Motorola, Inc. Dual state phase detector having frequency steering capability. 4,959,617, Cl. 328-133.000.
Martin, Hans; and Stutz, Gerhard, to Soddeutsche Kuhlerfabrik. Fluid friction clutch with a temperature control. 4,958,710, Cl. 192-58.00B.
Martin, Jeff L.: *See*—
Brown, David R.; and Martin, Jeff L., 4,959,071, Cl. 623-20.000.
Martin, LaVerne L. Bar-b-que grill scraper. 4,958,403, Cl. 15-236.070.
Martin, William G.: *See*—
Montgomery, Terry G.; and Martin, William G., 4,958,485, Cl. 57-210.000.
Martinchius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, to BASF Aktiengesellschaft. Fuels for gasoline engines. 4,959,077, Cl. 44-62.000.
Marui, Kuniyoshi, to Kabushiki Kaisha Toshiba. Radio telephone apparatus. 4,959,850, Cl. 379-58.000.
Marumo, Kuniomi: *See*—
Uchida, Hiroshi; Marumo, Kuniomi; and Chaen, Shigehiro, 4,959,451, Cl. 528-272.000.
Maruyama, Iwao; and Uzuyama, Kimitake, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for fastening parts securely in place using a band. 4,959,521, Cl. 219-121.630.
Massachusetts Institute of Technology: *See*—
Ganz, Matthew W., 4,959,653, Cl. 342-17.000.
Weaver, James C.; Ilias, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail L., 4,959,301, Cl. 435-5.000.
Masuda, Isao; Taomo, Toshio; and Sasaki, Fujio, to Kioritz Corporation. Connector tank means for cap for mouth of tank. 4,958,745, Cl. 220-375.000.
Masuda, Yoshiji, to Eiwa Industry Co., Ltd. Container for accommodating string-like articles and taking out the same. 4,958,733, Cl. 206-409.000.
Masui, Shoichi: *See*—
Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.
Masuoka, Fujio: *See*—
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.
Matarrese, Savino: *See*—
Biglione, Gianfranco; and Matarrese, Savino, 4,959,434, Cl. 526-342.000.
Mathellier, Lionel, to Draftex Industries Limited. Sealing and trimming. 4,959,081, Cl. 49-490.000.
Matier, William L.: *See*—
Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., 4,959,390, Cl. 514-522.000.
Matoba, Hiroyuki: *See*—
Kusaba, Yoshiaki; Matoba, Hiroyuki; and Yamada, Tsuneo, 4,958,509, Cl. 72-225.000.
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, to Minolta Camera Kabushiki Kaisha. Control device for use in a camera having an objective lens. 4,959,676, Cl. 354-400.000.
Matsui, Toshio: *See*—
Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.
Matsuki, Toshitsugu: *See*—
Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, 4,959,442, Cl. 528-168.000.
Matsumoto, Kaname: *See*—
Tanaka, Yasuzo; Matsumoto, Kaname; and Yamada, Yukio, 4,959,279, Cl. 428-660.000.
Matsumoto, Osamu: *See*—
Shimizu, Yasuhiko; Kobayashi, Hiroaki; and Matsumoto, Osamu, 4,958,762, Cl. 228-1.100.
Matsumoto, Susumu: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Matsumoto, Takashi: *See*—
Kashiwagi, Masayuki; and Matsumoto, Takashi, 4,959,550, Cl. 250-492.300.
Matsumoto, Tokikazu. Digital oscillation apparatus. 4,959,616, Cl. 328-14.000.
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, to Brother Kogyo Kabushiki Kaisha. Sheet heating device. 4,959,529, Cl. 219-388.000.
Matsumoto, Yumio: *See*—
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiycharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.
Yamamoto, Takemi; Komiya, Ryohei; Hatta, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiro, 4,959,682, Cl. 355-27.000.
Matsumura, Kazuo: *See*—
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, to Takeda Chemical Industries, Ltd. D-glucosaccharoascorbic acid. 4,959,483, Cl. 549-315.000.
Matsuo, Makoto: *See*—
Nakatani, Masayuki; Matsuo, Makoto; and Kusuki, Yoshihiro, 4,959,151, Cl. 210-640.000.
Matsuo, Noriko; and Mitome, Yukio, to NEC Corporation. Speech synthesizer using shift register sequence generator. 4,959,866, Cl. 381-51.000.
Matsuo Sangyo Co., Ltd.: *See*—
Kawamura, Yuzo; and Nakagawa, Sigeo, 4,958,678, Cl. 164-461.000.
Matsuo, Yukito; Ishida, Tsuyoshi; and Iwamoto, Masanori, to Kabushiki Kaisha Toshiba. Apparatus for conveying articles. 4,958,716, Cl. 198-346.100.
Matsuoka, Isamu; and Sato, Noboru, to Honda Giken Kogyo Kabushiki Kaisha. Electrocoating system with multistage voltage application to prevent electrode coating. 4,959,137, Cl. 204-299.0EC.
Matsuoka, Yoshiki; and Uchiki, Susumu, to Oki Electric Industry Co., Ltd. Printed circuit board. 4,959,510, Cl. 174-261.000.
Matsushita Electric Industrial Co., Ltd.: *See*—
Fujio, Katuharu, 4,958,993, Cl. 418-55.300.
Hatada, Kenzo; and Nagao, Koichi, 4,959,590, Cl. 315-169.300.
Honjo, Masahiro, 4,959,620, Cl. 329-327.000.
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotarou, 4,958,504, Cl. 62-244.000.
Kameoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, 4,959,625, Cl. 332-135.000.
Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.
Morotomi, Noriaki; Endo, Yasumasa; Emura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, 4,959,713, Cl. 358-108.000.
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, 4,958,501, Cl. 62-125.000.
Seima, Toshiaki; Yamamoto, Susumu; and Nakano, Hiromitsu, 4,958,948, Cl. 388-812.000.
Matsushita Electric Works, Ltd.: *See*—
Iwamoto, Hironori; and Ikeda, Shigeyuki, 4,958,628, Cl. 128-36.000.
Kimoto, Tetsuya; and Nakagawa, Masashi, 4,959,537, Cl. 250-223.00B.

Matsuura, Toshitaka: *See*—
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, 4,958,514, Cl. 73-25.030.

Matsuyama, Yukio: *See*—
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.

Matter & Siegmann AG: *See*—
Burtscher, Heinz; Schmidt-Ott, Andreas; and Siegmann, Hans-Christoph, 4,959,010, Cl. 431-12.000.

Matteucci, Mark D.: *See*—
Froehler, Brian C.; and Matteucci, Mark D., 4,959,463, Cl. 536-27.000.

Matthews, Thomas R.: *See*—
Crews, Phillip; Matthews, Thomas R.; and Inman, Wayne D., 4,959,370, Cl. 514-280.000.

Mattson, Roy D. Ball and socket attachment for fluid spray gun plunger. 4,959,159, Cl. 239-526.000.

Matzner, Markus; and Papuga, Donald M., to Amoco Corporation. Amino-terminated poly(aryl ether ketones). 4,959,424, Cl. 525-471.000.

Mauleon, Jean-Louis; and Sigaud, Jean-Bernard, to C. Compagnie de Raffinage et de Distribution. Fluidized-bed catalyst regeneration. 4,959,334, Cl. 502-43.000.

May, Arno: *See*—
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

May & Baker Limited: *See*—
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Maya, Rachel. Portable sun shade. 4,958,652, Cl. 135-87.000.

Mazda Motor Corporation: *See*—
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatsae, Fumio, 4,958,606, Cl. 123-316.000.
Iwaki, Tetsuhiro; and Seikaku, Hazime, 4,958,883, Cl. 296-152.000.
Tanaka, Hideki; and Umemura, Kyoichi, 4,959,042, Cl. 474-134.000.

McAnalley, Bill H., to Carrington Laboratories Inc. Processes for preparation of aloe products products produced thereby and compositions thereof. 4,959,214, Cl. 424-195.100.

McAnany, Robert E.: *See*—
Fuchs, Harold E.; and McAnany, Robert E., 4,959,129, Cl. 204-28.000.

McClellan, Paul G.: *See*—
Owens, R. Larry; and McClellan, Paul G., 4,959,251, Cl. 428-41.000.

McCown, Jack T.: *See*—
Aronson, Michael P.; Cardinali, Martin S.; and McCown, Jack T., 4,959,179, Cl. 252-135.000.

McCrane, David P. Safety glove. 4,958,384, Cl. 2-162.000.

McCullough, Francis P., Jr.; and Novak, Leo R., to Dow Chemical Company, The. Fluorinated non-graphitic carbonaceous films and foams. 4,959,261, Cl. 428-312.200.

McCurry, Patrick M.: *See*—
Ravi, Prasad S.; Kickle, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., 4,959,468, Cl. 536-127.000.

McDermott, Mark W.; and Carter, Ernest A., to Motorola, Inc. MOS output buffer with reduced supply line disturbance. 4,959,561, Cl. 307-443.000.

McDonald, Henry H. Intraocular lens implantation. 4,959,070, Cl. 623-6.000.

McDonnell Douglas Corporation: *See*—
Kegelman, Jerry T.; Kroutil, Joseph C.; and Lusk, Rodney, 4,958,932, Cl. 356-383.000.

McGowan, John B., Sr.: *See*—
Hagan, Thomas E.; and McGowan, John B., Sr., 4,958,657, Cl. 137-513.500.

McGrane, Eugene W., to Homac Mfg. Company. Submersible splice apparatus. 4,959,508, Cl. 174-84.00C.

McGraw, Philip W.; Ward, Eldon L.; and Edens, Michael W., to Dow Chemical Company, The. Esterified polyglycol lubricants for refrigeration compressors. 4,959,169, Cl. 252-68.000.

McGuire, Michael T.: *See*—
Wyss, Clement R.; McGuire, Michael T.; and Frost, John R., 4,959,230, Cl. 426-102.000.

McIntosh, James L., to Tensor Development, Inc. System for tightening threaded fastener assemblies. 4,959,797, Cl. 364-508.000.

McIntyre, David G.: *See*—
Lemnios, Zachary J.; McIntyre, David G.; Lau, Chung-Lim; and Williams, Dennis A., 4,959,705, Cl. 357-51.000.

McIver, Robert T., Jr.; and Hunter, Richard L., to Ionspec Corporation; and Knobbe, Martens, Olson & Bear. Method and apparatus for acceleration and detection of ions in an ion cyclotron resonance cell. 4,959,543, Cl. 250-291.000.

McKinlay, Peter R., to Amcor Limited. Shear stiffness tester. 4,958,522, Cl. 73-847.000.

McKinnon, Gordon. Simulated marble. 4,959,250, Cl. 428-15.000.

McLay, Iain M.: *See*—
Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

McNabb, Scott: *See*—
Filhey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.

McNeil, Sandy: *See*—
Petty, John; and McNeil, Sandy, 4,959,506, Cl. 174-65.00R.

Mead Corporation, The: *See*—
Spamer, William S., 4,958,739, Cl. 211-153.000.
Wood, Prentice J.; and Calvert, Rodney K., 4,958,734, Cl. 206-435.000.

Meade, Alan J.; and Smith, Paul W., to Simplimatic Engineering Company. Conveyor guide railing assembly. 4,958,725, Cl. 198-836.100.

Mechanical Technology Incorporated: *See*—
Corey, John A., 4,958,496, Cl. 60-521.000.

Mecredy, Henry E., III: *See*—
O'Neal, Glenn B.; Baker, Quentin A.; Mecredy, Henry E., III; and Terna, Daniele, 4,958,605, Cl. 123-300.000.

Medalert Incorporated: *See*—
Minet, Ronald G.; Tsotsis, Theodore T.; and Benson, Sidney W., 4,959,202, Cl. 423-502.000.

Medtronic, Inc.: *See*—
Duggan, Stephen R., 4,958,632, Cl. 128-419.0PG.

Meeker, Paul K., to Spalding & Evenflo Co., Inc. Infant carrier with hooks for use with shopping carts. 4,958,887, Cl. 297-250.000.

Mehrotra, Pankaj K.; and Billman, Elizabeth R., to Kennametal Inc. Alumina-zirconia-silicon carbide-magnesia cutting tools. 4,959,331, Cl. 501-89.000.

Mehrotra, Pankaj K.; and Billman, Elizabeth R., to Kennametal Inc. Alumina-zirconia-carbide whisker reinforced cutting tools. 4,959,332, Cl. 501-89.000.

Meier, Gerhard: *See*—
Leiber, Heinz; Klinker, Walter; and Meier, Gerhard, 4,958,704, Cl. 188-285.000.

Meier, Lothar: *See*—
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.

Meikrantz, David H., to United States of America, Energy. Method for separating disparate components in a fluid stream. 4,959,158, Cl. 210-787.000.

Meindl, Bernd, to Konrad Doppelmayr & Sohn Maschinenfabrik Gesellschaft m.b.H. & Co. KG. Cable transport system with garaging of carriers. 4,958,574, Cl. 104-88.000.

Meiri, Samuel: *See*—
Willits, Samuel P.; Meiri, Samuel; and Muckerheide, Jon C., 4,958,824, Cl. 271-11.000.

Melzig, Manfred, to Optische Werke G. Rodenstock. Photochrome spiroindoline-oxazines. 4,959,471, Cl. 544-71.000.

Mendenhall, David L., to Holbrook-Patterson, Inc. Rest cot assembly. 4,958,390, Cl. 5-110.000.

Menendez, Alfredo S. Lapping machine. 4,958,464, Cl. 51-241.0VS.

Menzin, Marvin: *See*—
Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., 4,959,109, Cl. 156-73.400.

Mercatali, Lucinao: *See*—
Brunetto, Lari; and Mercatali, Lucinao, 4,959,046, Cl. 493-382.000.

Merck & Co., Inc.: *See*—
Muir, Larry A., 4,959,382, Cl. 514-378.000.

Mercola, Gerald K.; and Huang, Shih-Hsing, to ICS Electronics Corporation. Data transmission method and bus extender. 4,959,833, Cl. 371-32.000.

Mereyala, Hari B.: *See*—
Frei, Bruno; Mereyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.

Merlette, John. Foot prosthesis and method of making same. 4,959,073, Cl. 623-55.000.

Merrell Dow Pharmaceuticals Inc.: *See*—
Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., 4,959,392, Cl. 514-712.000.

Mestek, Inc.: *See*—
Lentz, Gary J.; and Almaguer, Michael J., 4,958,555, Cl. 98-121.100.

Metallurgie Hoboken-Overpelt: *See*—
Van Camp, Maurits C.; Wattel, Philippe M.; and Delvaux, Andre L., 4,959,085, Cl. 55-72.000.

Metalquima, S.A.: *See*—
Lagares, Narciso C., 4,958,410, Cl. 17-25.000.

Metrologic Instruments, Inc.: *See*—
Khowles, Carl H., 4,958,894, Cl. 350-6.600.

Mettler, Hans P.: *See*—
Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, 4,959,475, Cl. 544-324.000.

Metzger, John R.: *See*—
Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., 4,959,633, Cl. 338-22.00R.

Meyer, James M.; Schmidt, David A.; and Donner, Peter M., to Imago Quaestus, Inc. Video storage cabinet. 4,959,582, Cl. 312-307.000.

Meyer, Norbert: *See*—
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,959,098, Cl. 71-95.000.

Meyer, Pieter N. Suspension system for vertical blinds. 4,958,672, Cl. 160-168.100.

Meyer, Rolf-Volker; Dhein, Rolf; Wandel, Martin; Selbeck, Harald; Fahnler, Friedrich; Heinz, Hans-Detlef; and Muller, Peter-Rolf, to Bayer Aktiengesellschaft. Alpha-amino-epsilon-caprolactam-modified polyamide preparation. 4,959,452, Cl. 528-328.000.

Meyer, Roth & Pastor Maschinenfabrik GmbH: *See*—
Exner, Karl-Christoph; Reichow, Franz; and Becker, Horst, 4,959,519, Cl. 219-110.000.

Meyers, Theodore W., to Tuf-Tite, Inc. Gas baffle device for on-site waste disposal systems. 4,959,145, Cl. 210-532.200.

Meyn, Cornelis. Device for removing the craw of slaughtered poultry. 4,958,408, Cl. 17-11.000.

Michel, Alan D.: *See*—
Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., 4,959,852, Cl. 379-70.000.

Michel, Alfred: *See*—
Heller, Rudolf; and Michel, Alfred, 4,958,817, Cl. 269-323.000.

Michelson, Gary K. Cannula having side opening. 4,959,058, Cl. 604-280.000.

Michna, Claus G. System for desalinization of saltwater. 4,959,127, Cl. 202-177.000.

Micic, Ljubomir; and Flamm, Peter M., to Deutsche ITT Industries GmbH. Remote control system with menu driven function selection. 4,959,721, Cl. 358-194.100.

Micro Encoder, Inc.: *See*—
Andermo, Nils I., 4,959,615, Cl. 324-690.000.

Micro Vesicular Systems, Inc.: *See*—
Wallach, Donald F. H., 4,959,341, Cl. 502-404.000.

Micron Technology, Inc.: *See*—
Lee, Ruojia R.; and Durcan, D. M., 4,959,325, Cl. 437-30.000.

Microtek Lab., Inc.: *See*—
Chen, Philip L., 4,958,826, Cl. 271-124.000.

Midmark Corporation: *See*—
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Midwest Power Concepts, Ltd.: *See*—
Fonseen, Dwayne, 4,958,598, Cl. 123-1.00A.

Mies, Eric W.: *See*—
Tynes, Arthur R.; and Mies, Eric W., 4,958,905, Cl. 350-96.210.

Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, to Fuji Photo Film Co., Ltd. Automatic focusing adjusting device. 4,959,726, Cl. 358-227.000.

Mikel, Steven A.: *See*—
Klotz, James R.; Mikel, Steven A.; Frait, John A.; and Martin, Berthold, 4,959,043, Cl. 475-230.000.

Miki, Hiroshi: *See*—
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.

Miki, Yoshiaki: *See*—
Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.

Milbourn, Bart L.: *See*—
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Milburn, Gary L.; Rabbie, Judith; and Houta, Thomas M., to Syntex (U.S.A.) Inc. Assay for antigens by binding immune complexes to solid supports free of protein and non-ionic binders. 4,959,303, Cl. 435-7.000.

Mildner, Richard C. Pet restraint. 4,958,597, Cl. 119-109.000.

Miles Inc.: *See*—
Woodrum, David L., 4,959,305, Cl. 435-7.000.

Miles, Peter J.: *See*—
Dunk, Paul; Hindin, Roger M.; and Miles, Peter J., 4,959,264, Cl. 428-331.000.

Miller, David A. B.: *See*—
Lentine, Anthony L.; and Miller, David A. B., 4,959,534, Cl. 250-213.00A.

Miller, Joseph P., to Compaq Computer Corporation. Negative feedback circuit to control the duty cycle of a logic system clock. 4,959,557, Cl. 307-265.000.

Miller, Robert R., II: *See*—
Erving, Richard H.; and Miller, Robert R., II, 4,959,857, Cl. 379-390.000.

Miller, Ronald L. Vehicle deceleration warning apparatus. 4,959,634, Cl. 340-467.000.

Miller, Russell S.: *See*—
Johnson, Neil A.; Miller, Russell S.; and Hunter, Gordon B., 4,959,841, Cl. 373-10.000.

Miller, Wilbur T.; Calamito, Dominic P.; and Pusch, Richard H., to Hitco. Woven multi-layer angle interlock fabrics having fill weaver yarns interwoven with relatively straight extending warp yarns. 4,958,663, Cl. 139-384.00R.

Millhone, Ralph S.: *See*—
Nguyen, Tinh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.

Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, to Lonza Ltd. Process for the production of 2,4-diamino-6-piperidinyl-pyrimidine-3-N-oxide. 4,959,475, Cl. 544-324.000.

Milner, Nigel E.: *See*—
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,959,480, Cl. 548-262.400.

Milwaukee Electric Tool Corporation: *See*—
Palm, Bernhard, 4,958,840, Cl. 279-62.000.

Minami, Norio: *See*—
Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

Minamitaka, Junichi; Sato, Kunio; and Ino, Mayumi, to Casio Computer Co., Ltd. Apparatus for extracting envelope data from an input waveform signal and for approximating the extracted envelope data. 4,958,552, Cl. 84-603.000.

Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, to Cosmo Oil Co., Ltd.; Dow Corning Kabushiki Kaisha; and Tochigifujisangyo Kabushiki Kaisha. Fluid composition for use in viscous coupling. 4,959,166, Cl. 252-327.00E.

Minatronics Corporation: *See*—
Wilson, Edwin P., 4,959,635, Cl. 340-568.000.

Minet, Ronald G.; Tsotsis, Theodore T.; and Benson, Sidney W., to Medalert Incorporated. Recovery of chlorine from hydrogen chloride by carrier catalyst process. 4,959,202, Cl. 423-502.000.

Minnesota Mining and Manufacturing Company: *See*—
Lea, Bernard A.; Burrows, Ronald W.; Hellings, Thomas D. G.; Barlow, Charles G.; and Skoog, Ivan H., 4,959,294, Cl. 430-204.000.
Palazzotto, Michael C., 4,959,297, Cl. 430-322.000.
Wood, Leigh E.; and Noreen, Allen L., 4,959,265, Cl. 428-343.000.

Mino, Masayuki; and Yamada, Osamu, to Minolta Camera Kabushiki Kaisha. Image signal processing method and apparatus with elongated picture elements. 4,959,736, Cl. 358-471.000.

Minolta Camera Kabushiki Kaisha: *See*—
Hayashi, Yuji; Sakakibara, Susumu; and Maeda, Katsumi, 4,959,692, Cl. 355-253.000.
Ito, Hideo, 4,959,684, Cl. 355-55.000.
Johdai, Akiyoshi; Kinoshita, Keichi; Yamashita, Hiroki; and Matsui, Toshio, 4,958,820, Cl. 270-52.000.
Kato, Akio, 4,959,685, Cl. 355-72.000.
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.
Mino, Masayuki; and Yamada, Osamu, 4,959,736, Cl. 358-471.000.
Naiki, Toshio; and Kuroda, Muneo, 4,959,664, Cl. 346-108.000.
Nakatani, Munehiro, 4,959,737, Cl. 358-475.000.
Saito, Naomasa, 4,958,828, Cl. 271-186.000.
Ueda, Toshihiko; Tutiyasu, Kouitirou; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, 4,959,824, Cl. 369-44.140.
Yamamoto, Kouji; Tominaga, Shinji, Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.

Mips Computer Systems, Inc.: *See*—
Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., 4,959,779, Cl. 364-200.000.

Mise, Noritoshi: *See*—
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.

Misura, Michael S.; and Sare, Edward J., to PPG Industries, Inc. Cyclohexenic additives for producing polycarbonate polymers of high refractive index and low yellowness. 4,959,429, Cl. 526-230.500.

Mita, Yoshiharu: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.

Mitchell, Dennis R.: *See*—
Lloyd, Graham P.; and Mitchell, Dennis R., 4,959,511, Cl. 178-18.000.

Mitchell, William S., to Prescision Porous Pipe, Inc. Process for making uniform porosity flexible irrigation pipe. 4,958,770, Cl. 239-145.000.

Mitchinson, James C.: *See*—
Skrgatic, Damir M. J.; Mitchinson, James C.; and Graham, John A., 4,959,228, Cl. 426-11.000.

Mitome, Yukio: *See*—
Matsuo, Noriko; and Mitome, Yukio, 4,959,866, Cl. 381-51.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Chiba, Kazuhiro; and Bamba, Noriko, 4,959,663, Cl. 346-76.0PH.
Itoh, Hiroki, 4,959,242, Cl. 427-38.000.
Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, 4,959,347, Cl. 505-1.000.
Kobayashi, Yousuke; and Fukazawa, Keiichi, 4,958,950, Cl. 400-629.000.
Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, 4,959,787, Cl. 364-424.050.
Nishimura, Shinji, 4,959,595, Cl. 318-138.000.
Ohashi, Yutaka, 4,958,615, Cl. 123-617.000.
Okamoto, Tatsuo; and Ohsaki, Akihiko, 4,959,329, Cl. 437-187.000.
Shinichi, Satoh, 4,959,698, Cl. 357-23.600.
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
Watanabe, Jinzo, 4,959,709, Cl. 357-23.600.
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
Yasumoto, Kazuhiro; and Hagiwara, Ippei, 4,959,571, Cl. 310-67.00R.

Mitsubishi Jukogyo K.K.: *See*—
Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.

Mitsubishi Kasei Corporation: *See*—
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.
Miura, Konoe; Ozawa, Tetsuo; and Yoneyama, Keiko, 4,959,172, Cl. 252-299.100.
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Mitsubishi Metal Corporation: *See*—
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.

Mitsubishi Pencil Co., Ltd.: *See*—
Suda, Yoshihisa, 4,959,185, Cl. 264-81.000.

Mitsubishi Rayon Company, Ltd.: *See*—
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, 4,959,438, Cl. 528-98.000.
Mitsubishi Yuka Badische Company, Ltd.: *See*—
Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, 4,959,428, Cl. 526-201.000.
Mitsui, Akio; and Ozawa, Takashi, to Fuji Photo Film Co., Ltd. Silver halide color photographic material. 4,959,298, Cl. 430-496.000.
Mitsui, Kenichi: *See*—
Shigeki, Terumitsu; and Mitsui, Kenichi, 4,958,789, Cl. 248-56.000.
Mitsui Petrochemical Industries Ltd.: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Mitsui Pharmaceuticals, Inc.: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Mitsui Toatsu Chemicals, Inc.: *See*—
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.
Yamaya, Norimasa; Ohta, Masahiro; and Yamaguchi, Akihiro, 4,959,443, Cl. 528-170.000.
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, to Hitachi, Ltd.; and Hitachi Koki Co., Ltd. Duplex reproducing apparatus with device for cooling and conveying fused toner image. 4,959,693, Cl. 355-290.000.
Mitulla, Konrad: *See*—
Taubitz, Christof; Seiler, Erhard; Hambrecht, Juergen; Mitulla, Konrad; and Boehlke, Klaus, 4,959,415, Cl. 525-133.000.
Miura, Hideo: *See*—
Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, 4,959,729, Cl. 358-229.000.
Miura, Konoe; Ozawa, Tetsuo; and Yoneyama, Keiko, to Mitsubishi Kasei Corporation. Liquid crystal composition containing a pleochroic azo type compound. 4,959,172, Cl. 252-299.100.
Miura, Michiko; and Gabel, Detlef, to United States of America, Energy. Porphyrins for boron neutron capture therapy. 4,959,356, Cl. 514-64.000.
Miura, Tadashi; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, to Toa Nenryo Kogyo Kabushiki Kaisha. Heat-resistant catalyst carrier moldings and catalysts for combustion. 4,959,338, Cl. 502-263.000.
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitu, to Hitachi, Ltd. Motor rotation control apparatus with motor rotational frequency memory. 4,959,733, Cl. 358-338.000.
Miura, Yumiko: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, to Hitachi, Ltd. Address space switching apparatus. 4,959,778, Cl. 364-200.000.
Miyake, Izumi: *See*—
Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.
Miyake, Tamio: *See*—
Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.
Miyamoto, Kouichi, to Ryobi Ltd. Radial arm saw. 4,958,544, Cl. 83-471.300.
Miyao, Yukimitsu: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
Miyashita, Kunio: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Miyazaki, Jiro: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.
Miyazaki, Kouji: *See*—
Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.
Miyazawa, Hidehisa: *See*—
Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.
Miyazono, Tadafumi; and Ishikura, Shinichi, to Nippon Paint Co., Ltd. Composite acrylic resin particles. 4,959,417, Cl. 525-274.000.
Miyoshi, Akio, to Kabushiki Kaisha Toshiba. Microprogram processor with logic circuitry for combining signals from a microcode decoder and an instruction code decoder to produce a memory access signal. 4,959,780, Cl. 364-200.000.
Mizuno, Masahiko: *See*—
Fukuda, Hiroshi; Miura, Hideo; and Mizuno, Masahiko, 4,959,729, Cl. 358-229.000.
Mizunoya, Nobuyuki: *See*—
Tanaka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, 4,959,507, Cl. 174-260.000.
MLR Electronique: *See*—
Lamiraux, Christian J., 4,959,655, Cl. 342-389.000.
Mochizuki, Akio, to NEC Corporation. Omnidirectional antenna assembly. 4,959,657, Cl. 343-725.000.
Mogi, Hirokazu: *See*—
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, 4,959,728, Cl. 358-228.000.
Mogro-Campero, Antonio; and Turner, Larry G., to General Electric Company. Composite with Y-BA-CU-O superconductive film. 4,959,346, Cl. 505-1.000.
Mogurt Gepjarmu Kulkereskedelmi Vallalat: *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.
Mohacsi, Erno; and O'Brien, Jay P., to Hoffmann-La Roche Inc. Phenyl-thiazepinones as calcium regulating agents. 4,959,359, Cl. 514-211.000.
Mohns, Lawrence: *See*—
Berg, Robin; Mohns, Lawrence; and Oswald, Richard, 4,958,957, Cl. 405-55.000.
Moisson, Claude, to Biovallees. Device for blood sampling and analysis. 4,959,196, Cl. 422-68.050.
Molecular Diagnostics, Inc.: *See*—
Dattagupta, Nanibhushan; and Crothers, Donald M., 4,959,309, Cl. 435-6.000.
Moli Energy Limited: *See*—
Dahn, Jeffery R.; and Way, Brian M., 4,959,282, Cl. 429-224.000.
Moller, Alexander; Friedrich, Heinz; Kuhn, Herbert; and Winkler, Kurt, to Degussa Aktiengesellschaft. Method of producing coarse crystalline nicotinic acid with a high degree of purity. 4,959,478, Cl. 546-319.000.
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, to Kabushiki Kaisha Toshiba. Electrically erasable programmable read-only memory with NAND cell structure. 4,959,812, Cl. 365-185.000.
Mondek, Martin J.: *See*—
Bland, Gerald F.; Freitag, Michael W.; and Mondek, Martin J., 4,959,033, Cl. 440-76.000.
Mongia, Hukam C.: *See*—
Wilkes, Colin; Mongia, Hukam C.; and Tramm, Peter C., 4,958,488, Cl. 60-39.550.
Monroe, Bruce M.: *See*—
Smothers, William K.; Monroe, Bruce M.; and Chan, Dominic M. T., 4,959,284, Cl. 430-2.000.
Monsanto Company: *See*—
Crutchfield, Marvin M.; Horng, Liou-Liang; and Schultz, Robert G., 4,959,496, Cl. 562-583.000.
Felthouse, Timothy R., 4,959,494, Cl. 562-515.000.
Montedipe S.p.A.: *See*—
Brichta, Corrado; Vezzoli, Annibale; and Borghi, Angelo, 4,959,397, Cl. 521-96.000.
Montedison S.p.A.: *See*—
Biglione, Gianfranco; and Matarrese, Savino, 4,959,434, Cl. 526-342.000.
Montgomery, Terry G.; and Martin, William G., to Springs Industries, Inc. Corespun yarn for fire resistant safety apparel. 4,958,485, Cl. 57-210.000.
Moody, Harold G., to United States of America, Army. Anatomically shaped earseals for headsets. 4,958,697, Cl. 181-129.000.
Mookherjee, Braja D.: *See*—
Wilson, Richard A.; Butler, Jerry F.; Withycombe, Donald; Mookherjee, Braja D.; Katz, Ira; and Schrankel, Kenneth R., 4,959,209, Cl. 424-81.000.
Morby, John A.: *See*—
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.
Morey, Booker W. Hair roller and heat source therefor. 4,958,648, Cl. 132-220.000.
Morgan, Donna R.: *See*—
Kraft, William G.; and Morgan, Donna R., 4,959,384, Cl. 514-390.000.
Morgan, Fred P., to F & S Corporation of Columbus, Georgia. Apparatus and method for producing color corrected reproduction of colored original images. 4,959,790, Cl. 364-518.000.
Morgan, George E. D.: *See*—
Fogal, Robert D., Sr.; Fogal, Robert D., Jr.; and Morgan, George E. D., 4,958,587, Cl. 118-206.000.
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, to Kabushiki Kaisha Toshiba. Image input/output apparatus. 4,959,871, Cl. 382-59.000.
Mori, Hidenobu, to Osada Electric Co., Ltd. Water-supplying cord and a tool for inserting a hose in it. 4,958,423, Cl. 29-235.000.
Mori, Kazumi: *See*—
Kurachi, Yasuhiko; Mori, Kazumi; and Koizumi, Hisao, 4,959,526, Cl. 219-314.000.
Mori, Masami: *See*—
Akai, Mikio; and Mori, Masami, 4,959,184, Cl. 264-40.300.
Mori, Nobuyuki: *See*—
Kuzii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.
Mori, Sanae; Sakamoto, Masaaki; Yamamoto, Koichi; and Sakai, Kenji, to Daido Metal Company, Ltd. Multilayered iron-copper-lead alloy bearing material. 4,959,274, Cl. 428-555.000.

Mori, Yonemitu: *See*—
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitu, 4,959,733, Cl. 358-338.000.
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, to Murata Manufacturing Co., Ltd. Non-reducing dielectric ceramic composition. 4,959,333, Cl. 501-136.000.
Morikawa, Juichi: *See*—
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Morimoto, Kazuhiro; and Taki, Tsuneo, to Murata Manufacturing Co., Ltd. Method and apparatus for measuring a force required for stripping adhered tape. 4,958,521, Cl. 73-827.000.
Morimoto, Masayuki: *See*—
Iizumi, Makoto; Ide, Tatsumi; Kaazawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
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Morin, Alain: *See*—
Bonnebat, Claude; Quentin, Jean-Pierre; and Morin, Alain, 4,959,252, Cl. 428-64.000.
Moring, Walter G., III, to AP Parts Manufacturing Company. Stamp formed muffler with pocket-free baffle crease. 4,958,701, Cl. 181-282.000.
Morioka, Akitoshi: *See*—
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Morishita, Mitsuharu; Uota, Kosaku; and Yasukawa, Takeshi, to Mitsubishi Denki Kabushiki Kaisha. Electric power steering device having a clutch. 4,959,787, Cl. 364-424.050.
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Kiyohara, Toshimi; and Morita, Toshiya, 4,959,803, Cl. 364-521.000.
Morlotti, Norberto: *See*—
Cappelli, Cataldo; and Morlotti, Norberto, 4,958,862, Cl. 285-334.000.
Moronaga, Takahiro: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
Morotomi, Noriaki; Endo, Yasumasa; Esmura, Yoshinori; Asaka, Nobuyoshi; and Inoue, Hideki, to Matsushita Electric Industrial Co., Ltd. Home automation system. 4,959,713, Cl. 358-108.000.
Morrill, Wayne J. Electric motor lubrication. 4,958,940, Cl. 384-398.000.
Morris, John C.; and Jackson, Winston J., Jr., to Eastman Kodak Company. Copolyesters from 4,4'biphenyldicarboxylic acid, 1,4-cyclohexanedimethanol and 1,6-hexanediol. 4,959,450, Cl. 528-272.000.
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Zavracky, Paul M.; and Morrison, Richard H., Jr., 4,959,515, Cl. 200-181.000.
Morscher, Erwin W.; and Frey, Otto, to Sulzer Brothers Limited; and Protek AG. Implant for strengthening the edge of a hip bone. 4,959,072, Cl. 623-22.000.
Morse, Robin C.: *See*—
Vaccaro, Angelo M.; and Morse, Robin C., 4,958,975, Cl. 414-259.000.
Morton Thiokol Inc.: *See*—
Russell, Peter G., 4,959,110, Cl. 156-187.000.
Moser, Frank H.; and Lynam, Niall R., to Donnelly Corporation. Electrochromic coating and method for making same. 4,959,247, Cl. 427-126.500.
Moses, Alan C.: *See*—
Carey, Martin C.; Moses, Alan C.; and Flier, Jeffrey S., 4,959,358, Cl. 514-171.000.
Mosley, Dennis: *See*—
Scott, James; and Mosley, Dennis, 4,959,783, Cl. 364-412.000.
Motev, Phil: *See*—
Bubley, Henry J.; Glotzbach, Joseph; and Motev, Phil, 4,958,559, Cl. 101-123.000.
Motorola Computer X: *See*—
Holman, Thomas H., Jr., 4,959,777, Cl. 364-200.000.
Motorola, Inc.: *See*—
Breeden, Robert L.; Griffin, Douglas E.; and Kinney, John H., Jr., 4,959,648, Cl. 340-825.440.
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.00R.
Martin, Frederick L., 4,959,617, Cl. 328-133.000.
McDermott, Mark W.; and Carter, Ernest A., 4,959,561, Cl. 307-443.000.
Moyer, Curtis D.; and Tsui, Raymond K., 4,959,702, Cl. 357-34.000.
Tobolski, Francis P., Jr.; and D'Avello, Robert F., 4,959,851, Cl. 379-59.000.
Mouissie, Bob, to Du Pont de Nemours, E. I., and Company. Filter connector with low frequency screening. 4,959,626, Cl. 333-182.000.
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Milla, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, 4,959,475, Cl. 544-324.000.
Moyal, Miki, to Advanced Micro Devices, Inc. Dual channel A/D and D/A converter with improved isolations. 4,959,650, Cl. 341-126.000.
Moyer, Curtis D.; and Tsui, Raymond K., to Motorola, Inc. Si-GaP-Si heterojunction bipolar transistor (HBT) on Si substrate. 4,959,702, Cl. 357-34.000.
MPV, Inc.: *See*—
Williamson, Roger L., 4,958,584, Cl. 114-270.000.
M'Sadoques, Andre J.: *See*—
Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., 4,959,514, Cl. 200-144.00R.
Mt. Sinai School of Medicine of the City University of New York: *See*—
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, 4,959,323, Cl. 435-320.000.
Muchowski, Joseph M.: *See*—
Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 324-469.000.
Muckerheide, Jon C.: *See*—
Willits, Samuel P.; Meiri, Samuel; and Muckerheide, Jon C., 4,958,824, Cl. 271-11.000.
Mueller, Richard A.; and Partis, Richard A., to G. D. Searle & Co. Method of treating inflammation, allergy, asthma and proliferative skin disease using heterocyclic amides. 4,959,364, Cl. 514-237.500.
Muhlbauer, Werner: *See*—
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, 4,958,994, Cl. 418-132.000.
Muir, Larry A., to Merck & Co., Inc. The use of certain compounds in livestock food as growth promotants for better feed utilization and improved carcass composition. 4,959,382, Cl. 514-378.000.
Mukherjee, Arabinda, to Lucas Industries public limited company. Transparencies. 4,959,257, Cl. 428-156.000.
Mule, Charles: *See*—
Mule, Ethel; and Mule, Charles, 4,958,760, Cl. 224-153.000.
Mule, Ethel; and Mule, Charles. Multi-purpose carrier for skis and the like. 4,958,760, Cl. 224-153.000.
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Reddy, Malireddy S.; Mullen, John; Washam, Clinton J.; Brown, C. Gordon; and Hunt, Charles C., 4,959,229, Cl. 426-39.000.
Muller, George H., to Berke, Joseph J.; and A.I.R. Foundation, a part interest. Manual surgical separator structure and method. 4,959,067, Cl. 606-190.000.
Muller, Karl-Heinz: *See*—
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Muller, Peter-Rolf: *See*—
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Muller, Richard E.: *See*—
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Muller, Rudolf: *See*—
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, 4,958,994, Cl. 418-132.000.
Munakata, Mitsuo: *See*—
Yoneda, Kenzi; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
Mundus, Friedhelm, to Windmoller & Holscher. Process for producing flattened gusseted tubing from flat plastic film. 4,959,114, Cl. 156-204.000.
Murai, Shigenobu: *See*—
Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, 4,959,598, Cl. 318-599.000.
Murakami, Tsutomu: *See*—
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Murakami, Yuichi: *See*—
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Murano, Katsuaki: *See*—
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
Murasoka, Takatoshi; Akira, Nishio; and Tsuji, Tomohiro, to Shimadzu Corporation. Electronic counting balance. 4,958,693, Cl. 177-25.170.
Murasaki, Keiichi, to Sega Enterprises, Ltd. Miniature storage container for a manually propelled toy member. 4,959,035, Cl. 446-40.000.
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Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.
Murata Manufacturing Co., Ltd.: *See*—
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, 4,959,333, Cl. 501-136.000.
Morimoto, Kazuhiro; and Taki, Tsuneo, 4,958,521, Cl. 73-827.000.
Uchida, Katsuyuki, 4,959,632, Cl. 338-22.00R.
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Murayama, Jin: *See*—
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.
Murphree, Francis J., to United States of America, Navy. Intruder target monitoring sonar alarm system. 4,959,817, Cl. 367-97.000.
Murray, Mark J.: *See*—
Foster, Donald C.; Murray, Mark J.; and Berkner, Kathleen L., 4,959,318, Cl. 435-69.100.
Murti, Dasarao K.: *See*—
Ong, Beng S.; Keoshkerian, Barkev; Baranyi, Giuseppa; and Murti, Dasarao K., 4,959,288, Cl. 430-59.000.
Muzechuk, Richard A.: *See*—
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Muzslay, Steven Z., to ITT Corporation. Fuel injector adaptor. 4,959,027, Cl. 439-655.000.
Nabisco Brands, Inc.: *See*—
Aquino, Agostino; and Lang, Karl U., 4,958,556, Cl. 99-355.000.
Aquino, Agostino; and Lang, Karl U., 4,959,235, Cl. 426-281.000.
Klemann, Lawrence P.; Finley, John W.; and Scimone, Anthony, 4,959,465, Cl. 536-115.000.
Nadland, Karl J.; and Kleppe, Mari A., to Collett-Marwell Hauge A/S. Magnesium additive for nutrients, feed, and medicaments. 4,959,222, Cl. 424-692.000.
Nagahama, Hideki: *See*—
Inaba, Shin-ichi; and Nagahama, Hideki, 4,959,200, Cl. 423-347.000.
Nagai, Makoto: *See*—
Kuroda, Shigeaki; Oguni, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
Nagamori, Hiroyuki: *See*—
Yamauchi, Michihide; Nagamori, Hiroyuki; Wakasa, Masanobu; and Ishikawa, Atsushi, 4,958,998, Cl. 423-445.000.
Nagao, Koichi: *See*—
Hatada, Kenzo; and Nagao, Koichi, 4,959,590, Cl. 315-169.300.
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, to Omron Tateisi Electronics Co. IC card with keyboard for prestoring transaction data. 4,959,788, Cl. 364-408.000.
Nagawa, Yoshinobu; Honda, Koichi; and Nakanishi, Hiroshi, to Agency of Industrial Science & Technology. Indole derivatives. 4,959,479, Cl. 548-255.000.
Naiki, Toshio; and Kuroda, Muneo, to Minolta Camera Kabushiki Kaisha. Laser scanner with beam transmissivity control. 4,959,664, Cl. 346-108.000.
Naimpally, Saiprasad V.: *See*—
Bugni, Anthony R.; Phillips, Larry G.; Darby, Ted A.; Naimpally, Saiprasad V.; and Burdick, William S., 4,959,716, Cl. 358-139.000.
Najm, Emile G. Impact cushioning and avoiding device. 4,958,651, Cl. 135-82.000.
Nakada, Akio: *See*—
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
Nakada, Morihito: *See*—
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Nakadai, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, to Fuji Photo Film Co., Ltd. Head positioner. 4,959,599, Cl. 318-603.000.
Nakagaki, Shintaro: *See*—
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, 4,959,722, Cl. 358-211.000.
Nakagawa, Akio: *See*—
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Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, to Canon Kabushiki Kaisha. Photovoltaic element with a semiconductor layer comprising non-single crystal material containing at least ZN, SE and H in an amount of 1 to 4 atomic %. 4,959,106, Cl. 136-258.000.
Nakagawa, Katsuyoshi, to Daito Tech Kabushiki Kaisha. Fire damper. 4,958,687, Cl. 169-60.000.
Nakagawa, Masashi: *See*—
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Nakagawa, Sigeo: *See*—
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Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, to Banyu Pharmaceutical Company, Ltd. Crystalline cephalosporin compounds. 4,959,469, Cl. 540-222.000.
Nakagawa, Tadashi, to Seikosha Co., Ltd. Automatic focusing camera. 4,959,678, Cl. 354-403.000.
Nakagawa, Takehiro: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, to Tosoh Corporation. Composition comprising chlorosulfonated ethylene copolymer, epoxy resin and dimaleimide. 4,959,414, Cl. 525-11.000.
Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikutei, Satoru, to Nichia Kagaku Kogyo K.K. Phosphor which emits light by the excitation of X-ray. 4,959,174, Cl. 252-301.60R.
Nakajima, Shohachi; and Komeshima, Nobuyasu, to Kirin Beer Kabushiki Kaisha. 3'-deamino-3'-(2"-substituted-4"-morpholino)-anthracycline compounds. 4,959,460, Cl. 536-6.400.
Nakamori, Yoshiyuki: *See*—
Kanazawa, Yasunori; Nakamori, Yoshiyuki; Kuwa, Tadahiro; Fujimoto, Nobuyuki; and Abe, Shinichi, 4,959,744, Cl. 360-133.000.
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Nakamura, Kosei; and Hayashi, Yoshiyuki, to Fanuc Ltd. Motor cooling system. 4,959,570, Cl. 310-54.000.
Nakamura, Mitsuo, to Fuji Jukogyo Kabushiki Kaisha. Fuel injection control system for an automotive engine. 4,959,789, Cl. 364-431.050.
Nakamura, Toshinobu. to Shinagawa Shoko Co., Ltd. Tying means. 4,958,791, Cl. 248-74.100.
Nakamura, Yoshiyuki: *See*—
Kohno, Masahito; and Nakamura, Yoshiyuki, 4,958,852, Cl. 280-775.000.
Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, to Polyplastics Co., Ltd. Thermoplastic resin composition. 4,959,404, Cl. 524-267.000.
Nakanishi, Hiroshi: *See*—
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Nakanishi, Motohiro: *See*—
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Nakanishi, Tsutomu, to C.S.U. Ltd. Ball bearing. 4,958,943, Cl. 384-488.000.
Nakanishi, Tsutomu, to C.S.U. Ltd. Spindle unit. 4,958,945, Cl. 384-512.000.
Nakano, Fumio: *See*—
Nakagawa, Susumu; Ushijima, Ryosuke; Nakano, Fumio; Yamada, Koji; and Mano, Eiichi, 4,959,469, Cl. 540-222.000.
Nakano, Genichi; Higami, Sadao; and Hashimoto, Yasutaka, to Matsushita Electric Industrial Co., Ltd.; Fukuhou Teisan Co., Ltd.; and Dengen Co., Ltd. Refrigerant charging apparatus. 4,958,501, Cl. 62-125.000.
Nakano, Hiromitsu: *See*—
Seima, Toshiaki; Yamamoto, Susumu; and Nakano, Hiromitsu, 4,958,948, Cl. 388-812.000.
Nakano, Hiroshi: *See*—
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Nakano, Takuo: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Nakano, Yoichi: *See*—
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Nakano, Yuji: *See*—
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Nakase, Kiyoshi: *See*—
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Nakata, Yutaka, to Ichikoh Industries, Ltd. Automotive lamp assembly. 4,959,757, Cl. 362-61.000.
Nakatani, Masayuki; Matsuo, Makoto; and Kusuki, Yoshihiro, to UBE Industries. Pervaporation method of separating liquid organic compound mixture through aromatic imide polymer asymmetric membrane. 4,959,151, Cl. 210-640.000.
Nakatani, Munehiro, to Minolta Camera Kabushiki Kaisha. Image scanning apparatus for use in an image reader, a copying machine and the like. 4,959,737, Cl. 358-475.000.
Nakura, Kazuaki: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
Nalco Chemical Company: *See*—
Huang, Shu-Jen W.; and Stenger, Claudia V., 4,959,147, Cl. 210-712.000.
Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, to Nippon Oil Co., Ltd. Method for applying electromagnetic wave and ultrasonic wave therapies. 4,958,626, Cl. 128-24.00A.
Namco Ltd: *See*—
Tashiro, Koichi; Okamoto, Shinichiro; and Okamoto, Tatsuro, 4,958,835, Cl. 273-85.00G.
Namera, Takakazu; and Ogura, Naoto, to NEC Corporation. Orbit control system for a satellite. 4,958,788, Cl. 244-169.000.
Nandzik, Bernd: *See*—
Dollhope, Rudiger; and Nandzik, Bernd, 4,959,186, Cl. 264-102.000.
Nash, Boyd B. Pintle type trailer coupling. 4,958,848, Cl. 280-509.000.
Nassi, Menahem: *See*—
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National Federation of Agricultural Co-Operative Associations: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.
National Safety Devices, Inc.: *See*—
Woods, Richard E.; Bonner, Guy, Jr.; Smyth, Jerry S.; and Felton, Roger D., 4,959,637, Cl. 340-573.000.
National Semiconductor Corporation: *See*—
Knecht, Mark W.; and Frake, Scott O., 4,959,565, Cl. 307-542.000.
National Starch and Chemical Investment Holding Corporation: *See*—
Wasulko, William M., 4,959,008, Cl. 428-40.000.
Natsuume, Tadao: *See*—
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Natural Fibers Corp.: *See*—
Ragsdale, George, 4,959,038, Cl. 460-149.000.

Naturin-Werk Becker & Co.: *See*—
Winkler, Bruno, 4,958,477, Cl. 53-138.00R.

Naudin, Jacky, to Valeo. Torsion damping device, in particular for a flywheel type transmission of an automotive vehicle. 4,959,039, Cl. 464-66.000.

Naylor, Alan: *See*—
Lunts, Lawrence H. C.; Skidmore, Ian F.; Finch, Harry; Naylor, Alan; and Campbell, Ian B., 4,959,381, Cl. 514-357.000.

NCR Corporation: *See*—
Lyons, Dale R., 4,958,797, Cl. 248-345.100.
Saruta, Makoto; and Suzuki, Tatsuhiro, 4,959,874, Cl. 455-601.000.

Neave, James H.: *See*—
Dobson, Peter J.; and Neave, James H., 4,959,245, Cl. 427-53.100.

Nebe, William J.; and Osborne, James J., to Du Pont de Nemours, E. I., and Company. Process of making a photosensitive semi-aqueous developable ceramic coating composition. 4,959,295, Cl. 430-281.000.

NEC Corporation: *See*—
Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.
Matsuo, Noriko; and Mitome, Yukio, 4,959,866, Cl. 381-51.000.
Mochizuki, Akio, 4,959,657, Cl. 343-725.000.
Namera, Takakazu; and Ogura, Naoto, 4,958,788, Cl. 244-169.000.
Sato, Toshifumi, 4,959,644, Cl. 340-825.440.
Suzuki, Hiroyuki, 4,959,793, Cl. 364-900.000.
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.
Todoroki, Toshiya, 4,959,813, Cl. 365-189.120.

Nederlandse Centrale Organisatie voor Toegepast-Natuurwetenschappelijk Onderzoek: *See*—
Dijkema, Reinder; and Kos, Antonides, 4,959,462, Cl. 536-27.000.

Neidiffer, Fred; Fox, Charles E.; and Fox, Patsy E. Aluminium cleaning composition and process. 4,959,105, Cl. 134-3.000.

Nelson, Michael J. K.; Bourquin, Al W. J.; and Pritchard, Parmely H., to United States of America, Environmental Protection Agency. Biodegradation of chloroethylene compounds. 4,959,315, Cl. 435-167.000.

Nelson, Norman A.: *See*—
Putch, Samuel W., 4,958,686, Cl. 166-348.000.

Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., to Syntex (U.S.A.) Inc. Mycophenolic acid derivatives in the treatment of rheumatoid arthritis. 4,959,387, Cl. 524-469.000.

Nelson, Thomas E., to Sotech, Inc. Water heater construction. 4,958,620, Cl. 126-344.000.

Nemoto, Ichiro: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.

Neuffer, Ingemar; and Keller, Christian, to Siemens Aktiengesellschaft. Method and apparatus for the distance control of a positioning drive. 4,959,808, Cl. 364-566.000.

Neurodelivery Technology, Inc.: *See*—
Coombs, Dennis W., 4,958,901, Cl. 604-44.000.

Neuroth, David H., to Hubbell Incorporated. Electrical connector for high pressure applications with rapid pressure transients. 4,959,022, Cl. 439-589.000.

Newton, George; and Parzuchowski, Douglas A., to Dunham Tool Co., Inc., The. Overhead loader and related mechanisms for high speed automatic lathes and the like. 4,958,543, Cl. 82-124.000.

NEXUS ApS: *See*—
Schou, Herbert W. D., deceased; and Dreyer, Jack A., 4,959,233, Cl. 426-443.000.

Ng, Howard C. H.; and Hunter, Frederick J., to Du Pont Canada Inc. Fiber reinforced rubber products. 4,959,267, Cl. 428-390.000.

Ng, Yee S.: *See*—
Tai, Hwai T.; and Ng, Yee S., 4,959,730, Cl. 358-298.000.

NGK Insulators, Ltd.: *See*—
Akitsu, Yasuo, 4,958,860, Cl. 285-49.000.
Suzuki, Go, 4,959,255, Cl. 428-143.000.
Yoshida, Akihiko; and Yamada, Naohito, 4,959,258, Cl. 428-192.000.

NGK Spark Plug Co., Ltd.: *See*—
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, 4,958,514, Cl. 73-25.030.

Ngo, Khai D.: *See*—
Yerman, Alexander J.; and Ngo, Khai D., 4,959,630, Cl. 336-83.000.

Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., to Chevron Research Company. Steam injection profiling. 4,958,684, Cl. 166-252.000.

NHK Spring Co., Ltd.: *See*—
Ojima, Juji; Ishii, Kazuo; and Numakura, Fumio, 4,959,041, Cl. 474-111.000.

Niaudet, Brigitte: *See*—
Stanislas, Ehrlich; Laurent, Janniere; Evelyne, Pierre; and Niaudet, Brigitte, 4,959,316, Cl. 435-172.300.

Nichia Kagaku Kogyo K.K.: *See*—
Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikutei, Satoru, 4,959,174, Cl. 252-301.60R.

Nicholas, Edward D.: *See*—
Thomas, Wayne M.; and Nicholas, Edward D., 4,959,241, Cl. 427-11.000.

Nichols, Randall W., to Standard Oil Company, The. Hollow fiber separation module and method for the use thereof. 4,959,152, Cl. 210-651.000.

Nicolet Instrument Corporation: *See*—
Lutz, William J., 4,959,867, Cl. 381-107.000.

Nielson, Jay P.; and Sturm, Paul A., to Algae Farms. Method of growing and harvesting microorganisms. 4,958,460, Cl. 47-1.400.

Niemeyer, Tjaard R. J.: *See*—
Ernsting, Peter B.; Van Heteren, Jan; and Niemeyer, Tjaard R. J., 4,959,239, Cl. 426-603.000.

Nihon Parkerizing Co., Ltd.: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Nihon Samicon Co., Ltd.: *See*—
Sato, Akira; and Ono, Masatoshi, 4,958,806, Cl. 256-12.500.

Nihon Tokushu Orimono Co., Ltd.: *See*—
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.

Nilsson, Karl E., to Bayern-Chemie, Gesellschaft fur flugchemische Antriebe mbH. Electric ignition system. 4,959,011, Cl. 431-263.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.

Nippon Mining Co., Ltd.: *See*—
Shimauchi, Hidenori; and Suzuki, Keijiro, 4,959,278, Cl. 428-642.000.

Nippon Oil Co., Ltd.: *See*—
Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, 4,958,626, Cl. 128-24.00A.

Nippon Paint Co., Ltd.: *See*—
Miyazono, Tadafumi; and Ishikura, Shinichi, 4,959,417, Cl. 525-274.000.

Nippon Seiko Kabushiki Kaisha: *See*—
Imanari, Yoshifumi, 4,958,941, Cl. 384-474.000.

Nippon Sheet Glass Co., Ltd.: *See*—
Hasegawa, Jun, 4,959,270, Cl. 428-426.000.

Nippon Shokubai Kagaku Kogyo Co., Ltd.: *See*—
Shimomura, Tadao; Harada, Nobuyuki; and Ishizaki, Kunihiko, 4,959,060, Cl. 604-368.000.

Nippon Steel Corporation: *See*—
Arai, Mitsuru; Cassidy, Patrick E.; and Farley, James M., 4,959,447, Cl. 528-188.000.

Nippon Telegraph and Telephone Corporation: *See*—
Aikawa, Satoru; and Saito, Yoichi, 4,959,834, Cl. 371-47.100.

Nippon Zeon Co., Ltd.: *See*—
Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, 4,959,207, Cl. 424-76.100.

Nippondenso Co., Ltd.: *See*—
Horibe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, 4,959,576, Cl. 310-239.000.

Nishi, Yoshio; Azuma, Hideto; and Omaru, Atsuo, to Sony Corporation. Non aqueous electrolyte cell. 4,959,281, Cl. 429-194.000.

Nishida, Masayuki: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.

Nishida, Shinichi: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moromaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.

Nishihara, Akira: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Nishihata, Hideo: *See*—
Ichikawa, Toru; Nishihata, Hideo; Kagoroku, Nobuo; and Ito, Shotarou, 4,958,504, Cl. 62-244.000.

Nishijima, Toyoki; and Onodera, Kaoru, to Konica Corporation. Silver halide photographic light-sensitive material with improved gradation balance. 4,959,300, Cl. 430-546.000.

Nishikawa, Masato: *See*—
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.

Nishikawa, Masayuki; and Yagi, Shigeru, to Fuji Xerox Co., Ltd. Electrophotographic element having a surface layer and method for producing same. 4,959,289, Cl. 430-64.000.

Nishikawa, Tatsuo, to Canon Denshi Kabushiki Kaisha. Disc recording and/or reproducing apparatus including means for minimizing the effects of temperature changes. 4,959,740, Cl. 360-106.000.

Nishimura, Katsuhiko; Shinbo, Kazuyuki; and Kita, Masahiro, to Asahi Kogaku Kogyo Kabushiki Kaisha. Method and apparatus for forming a multicolor picture by electrophotography. 4,959,695, Cl. 355-327.000.

Nishimura, Shinichi: *See*—
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.

Nishimura, Shinji, to Mitsubishi Denki Kabushiki Kaisha. Rotating electric machine having a coil coaxial with rotating shaft. 4,959,595, Cl. 318-138.000.

Nissan Chemical Industries: *See*—
Kumura, Atsuhiko; Ishii, Ryuichi; Luo, Bing-Shan; Adachi, Meiro; Hamada, Kenji; and Fujita, Fumio, 4,959,091, Cl. 71-77.000.

Nissan Motor Co., Ltd.: *See*—
Hiraoka, Toyoki; Murakami, Yuichi; and Okitsu, Nobuyuki, 4,958,613, Cl. 123-572.000.
Okubo, Takashi; and Takemura, Toji, 4,958,711, Cl. 192-60.000.
Uchida, Koh; and Kurihara, Takashi, 4,958,695, Cl. 180-142.000.

Yamamoto, Tadahiro; and Ota, Ken, 4,958,610, Cl. 123-478.000.
Yoshioka, Masanori; and Kozai, Masafumi, 4,959,191, Cl. 264-529.000.
Nissin High Voltage Co., Ltd.: *See*—
Kashiwagi, Masayuki; and Matsumoto, Takashi, 4,959,550, Cl. 250-492.300.
Nix, Charles D.; and Baker, Johnny P. Cable boot. 4,958,790, Cl. 248-56.000.
Noda, Atsuhi, to Canon Kabushiki Kaisha. Ink jet recording apparatus. 4,959,673, Cl. 346-140.00R.
Noda, Toshio: *See*—
Yamamoto, Shigeo; and Noda, Toshio, 4,959,603, Cl. 320-1.000.
Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., to Chrysler Corporation. Clutch reaction and pressure plates in an automatic transmission. 4,958,753, Cl. 192-85.0AA.
Noguchi, Masaru; and Yamamoto, Masafumi, to Fuji Photo Film Co., Ltd. Semiconductor laser beam source apparatus. 4,958,893, Cl. 350-6.600.
Noguchi, Naoto: *See*—
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.
Noguera, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, to KAO Corporation. Pearling agent dispersion. 4,959,206, Cl. 424-70.000.
Nolan, William A., to United Technologies Automotive, Inc. Combination support and attachment bar for a window. 4,958,468, Cl. 52-204.000.
Nolle, William: *See*—
Markow, Paul A.; and Nolle, William, 4,958,777, Cl. 242-7.110.
Nomura, Kenji: *See*—
Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, 4,959,347, Cl. 505-1.000.
Nooyen, Johannes L.: *See*—
Barnes, Peter H.; and Nooyen, Johannes L., 4,958,680, Cl. 165-104.180.
Nordischer Maschinenbau Rud. Baader GmbH & Co.: *See*—
Braeger, Horst K. H.; and Pontow, Hugo, 4,958,409, Cl. 17-24.000.
Nordquist, Andrew F.; and Pinschmidt, Robert K., Jr., to Air Products and Chemicals, Inc. Process for making an acrylamide containing a dialkyl acetal group. 4,959,489, Cl. 560-170.000.
Noreen, Allen L.: *See*—
Wood, Leigh E.; and Noreen, Allen L., 4,959,265, Cl. 428-343.000.
Norlen, Hakan. Tensile force transmitting device, in particular a lifting device. 4,958,872, Cl. 294-75.000.
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, to Eastman Kodak Company. Photographic silver halide materials and process comprising a pyrazoloazole coupler. 4,959,480, Cl. 548-262.400.
North American Philips Corporation: *See*—
Bugni, Anthony R.; Phillips, Larry G.; Darby, Ted A.; Naimpally, Saiprasad V.; and Burdick, William S., 4,959,716, Cl. 358-139.000.
Joanino, Fernando A., 4,959,593, Cl. 315-290.000.
Prodan, Richard S., 4,959,715, Cl. 358-140.000.
Strubbe, Hugo J.; and Gentner, Donald R., 4,959,719, Cl. 358-183.000.
North Carolina State University: *See*—
Fedkiw, Peter S., Jr., 4,959,132, Cl. 204-101.000.
Shih, Jason C. H.; and Williams, C. Michael, 4,959,311, Cl. 435-68.100.
Norwich Eaton Pharmaceuticals, Inc.: *See*—
Kraft, William G.; and Morgan, Donna R., 4,959,384, Cl. 514-390.000.
Notron Engineering: *See*—
Winiger, Gerhard, 4,958,992, Cl. 418-29.000.
Novak, Leo R.: *See*—
McCullough, Francis P., Jr.; and Novak, Leo R., 4,959,261, Cl. 428-312.200.
Novo Industri A/S: *See*—
Frokjaer, Sven; Eriksen, Svend; and Adler-Nissen, Jens L., 4,959,350, Cl. 514-2.000.
Nowak, Michael T.: *See*—
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,563, Cl. 101-458.000.
Nowakowski, Stanley M., to Sure-Cast Pattern Works, Inc. Pad-forming device with hold-down knockout pin. 4,959,004, Cl. 425-397.000.
Nozue, Shigehiro: *See*—
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.
Nuckols, James H.: *See*—
Watters, Jeffrey S.; Brown, Norman P.; and Nuckols, James H., 4,959,860, Cl. 380-4.000.
Nuhn, Wolfgang: *See*—
Langlois, Jacques A. E.; Bergmann, Heinrich M. G.; and Nuhn, Wolfgang, 4,959,001, Cl. 425-147.000.
Nukui, Masahiro: *See*—
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.
Numakura, Funio: *See*—
Ojima, Juji; Ishii, Kazuo; and Numakura, Funio, 4,959,041, Cl. 474-111.000.
Oakland Engineering, Inc.: *See*—
Fiach, Alfred C., 4,958,983, Cl. 414-795.300.
Oates, Stephanie J.; and Sare, Edward J., to PPG Industries, Inc. Partially polymerized bis(allylic carbonate) monomer having high allylic utilization. 4,959,433, Cl. 526-314.000.
Ober, Jan K.; and Udden, Per, to Udden, Per. Eye movement measurement device with multiple light emitting and detecting elements. 4,958,925, Cl. 351-210.000.
Oberdorfer, Dietmar: *See*—
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.
O'Brien, Jay P.: *See*—
Mohacsi, Erno; and O'Brien, Jay P., 4,959,359, Cl. 514-211.000.
O'Brien, Thomas M.: *See*—
Nogle, Thomas D.; Martin, Berthold; and O'Brien, Thomas M., 4,958,753, Cl. 192-85.0AA.
O'Bryant, Carl E.: *See*—
Swagerty, Billy H., 4,958,594, Cl. 119-7.000.
O'Bryant, Linda K.: *See*—
Swagerty, Billy H., 4,958,594, Cl. 119-7.000.
Och, Rudolf, to Frenco Verzahnungslehren GmbH, Firma. Adapter sleeve. 4,958,969, Cl. 409-234.000.
Ochiai, Toshihiro: *See*—
Yanagawa, Hisaharu; Ochiai, Toshihiro; Hayakawa, Hirokazu; and Miyazawa, Hidehisa, 4,958,897, Cl. 350-96.150.
O'Connor, David F., to Checkrobot Inc. Article price indicator. 4,959,530, Cl. 235-383.000.
Oda, Kazuya: *See*—
Nakadei, Katsuo; Miyake, Izumi; Kaneko, Kiyotaka; and Oda, Kazuya, 4,959,599, Cl. 318-603.000.
Odabashian, Robert A., to W. R. Grace & Co.-Conn. Easy open, hemetically sealed, display package made from heat shrinkable film. 4,958,735, Cl. 206-497.000.
Odani, Yusuke: *See*—
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
Oelschlager, Karl G.: *See*—
Fett, Jurgen; Oelschlager, Karl G.; and Bannert, Wolfgang, 4,958,726, Cl. 198-852.000.
Oesterheld, Klaus: *See*—
Critelli, John; Oesterheld, Klaus; DeBaun, Carleton; and Dowstra, Bart, 4,959,761, Cl. 362-226.000.
Offensperger, Wolf: *See*—
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, 4,959,323, Cl. 435-320.000.
Officina Meccantica Giuseppe Conti: *See*—
Brunetto, Lari; and Mercatali, Lucinao, 4,959,046, Cl. 493-382.000.
Ogale, Kumar: *See*—
Thomspon, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.
Ogawa, Hiroshi: *See*—
Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, 4,958,502, Cl. 62-126.000.
Ogawa, Koji; and Machida, Hikoichi, to Sumitomo Precision Products Co., Ltd. Active control mechanism for a helicopter. 4,958,786, Cl. 244-17.130.
Ogawa, Yasuaki: *See*—
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.
Ogden, Daryl M., to Board of Regents, The University of Texas System. Immunoassay for antibodies binding platelets. 4,959,308, Cl. 435-7.000.
Ogino, Takao: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.
Ogiue, Katsumi: *See*—
Isomura, Satoru; Iwabuchi, Masato; and Ogiue, Katsumi, 4,959,704, Cl. 357-41.000.
Oguni, Kensaku: *See*—
Kuroda, Shigeaki; Oguni, Kensaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.
Ogura, Mitsuru, to Sharp Kabushiki Kaisha. Image forming apparatus. 4,959,681, Cl. 355-27.000.
Ogura, Naoto: *See*—
Namera, Takakazu; and Ogura, Naoto, 4,958,788, Cl. 244-169.000.
Ogura, Tsuneo; and Nakagawa, Akio, to Kabushiki Kaisha Toshiba. Turn-on/off driving technique for insulated gate thyristor. 4,959,703, Cl. 357-38.000.
Ogushi, Hiroshi: *See*—
Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.
Ohashi, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Signal generator for an internal combustion engine. 4,958,615, Cl. 123-617.000.
Ohata, Hideo: *See*—
Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, 4,959,799, Cl. 364-513.000.
Ohata, Takumi: *See*—
Oshima, Masahiko; Ohata, Takumi; and Hatori, Toshiyuki, 4,958,422, Cl. 29-129.500.
Ohba, Shinji: *See*—
Tsutsumi, Kazumasa; and Ohba, Shinji, 4,959,739, Cl. 360-95.000.
Ohfume, Yasufumi; Shimamoto, Keiko; and Shinozaki, Haruhiko, to Suntory Limited. Carboxycyclopropylglycine and process for producing the same. 4,959,493, Cl. 562-506.000.

Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, to Teijin Limited. Phosphazene article and process for producing the same. 4,959,442, Cl. 528-168.000.

Ohno, Hiroyasu: *See—*
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,36. Cl. 514-252.000.

Ohnuki, Ichiro: *See—*
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Ohnuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, to KAO Corporation. Indane derivative and perfumery composition comprising the same. 4,959,349, Cl. 512-14.000.

Ohouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, to Alps Electric Co., Ltd. Coordinate detecting device. 4,959,805, Cl. 364-562.000.

Ohsaki, Akihiko: *See—*
Okamoto, Tatsuo; and Ohsaki, Akihiko, 4,959,329, Cl. 437-187.000.

Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, to Mitsubishi Kasei Corporation. Substituted phenyl (or pyridyl) urea compound and herbicidal composition containing the same as active ingredient. 4,959,092, Cl. 71-88.000.

Ohta, Masahiro: *See—*
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.
Yamaya, Norimasa; Ohta, Masahiro; and Yamaguchi, Akihiro, 4,959,443, Cl. 528-170.000.

Ohta, Shohei, to Shikoku Kakoki Co., Ltd. Device for filling specified amount of liquid. 4,958,669, Cl. 141-311.00A.

Ohtaka, Keiji: *See—*
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohnuki, Ichiro, 4,959,677, Cl. 354-402.000.

Ohtsuki, Toru: *See—*
Miyadera, Hiroo; Ohtsuki, Toru; and Kawamura, Toshiaki, 4,959,778, Cl. 364-200.000.

Ohuchi, Kazunori: *See—*
Momodomi, Masaki; Masuoka, Fujio; Shirota, Riichiro; Itoh, Yasuo; Ohuchi, Kazunori; and Kirisawa, Ryouhei, 4,959,812, Cl. 365-185.000.

Ohyama, Takumi: *See—*
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

Oikawa, Hideaki: *See—*
Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Ojima, Juji; Ishii, Kazuo; and Numakura, Funio, to NHK Spring Co., Ltd. Tensioner for a chain, a belt or the like. 4,959,041, Cl. 474-111.000.

Oka, Koichiro; and Hagiwara, Ikuo, to Toray Industries, Inc. Powdery adhesive and process for preparation thereof. 4,959,398, Cl. 523-400.000.

Okada, Kazuo: *See—*
Sato, Akio; and Okada, Kazuo, 4,959,732, Cl. 358-336.000.

Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, to Canon Kabushiki Kaisha. Liquid crystal apparatus having light quantity of the backlight in synchronism with writing signals. 4,958,915, Cl. 350-345.000.

Okada, Toshihiko; and Uchida, Masanobu, to Daihen Corporation. Detection means for an electric arc torch nozzle. 4,959,520, Cl. 219-121.480.

Okahashi, Makoto: *See—*
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, 4,959,788, Cl. 364-408.000.

Okamoto, Shinichiro: *See—*
Tashiro, Koichi; Okamoto, Shinichiro; and Okamoto, Tatsuro, 4,958,835, Cl. 273-85.00G.

Okamoto, Tatsuo; and Ohsaki, Akihiko, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device. 4,959,329, Cl. 437-187.000.

Okamoto, Tatsuro: *See—*
Tashiro, Koichi; Okamoto, Shinichiro; and Okamoto, Tatsuro, 4,958,835, Cl. 273-85.00G.

Okano, Takashi, to Pioneer Electronic Corporation. Recorded information reproducing apparatus with reading and writing phase adjustment. 4,959,825, Cl. 369-48.000.

Oki Electric Industry Co., Ltd.: *See—*
Matsusaka, Yoshiki; and Ushiki, Susumu, 4,959,510, Cl. 174-261.000.

Okino, Kazuo: *See—*
Yasunaga, Susumu; and Okino, Kazuo, 4,958,513, Cl. 73-23.200.

Okita, Hiroshi: *See—*
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Okita, Tsutomu: *See—*
Aosuma, Masashi; Okita, Tsutomu; Hashimoto, Hiroshi; Araki, Hiroaki; Fukino, Kiyotaka; and Ejiri, Kiyomi, 4,959,263, Cl. 428-329.000.

Okitsu, Nobuyuki: *See—*
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Okitu, Shinobu: *See—*
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Okuyama, Kazuhiko, to Sumitomo Heavy Industries Ltd. Insert-type rotary core mold apparatus. 4,959,007, Cl. 425-577.000.

Oldani, Emilio: *See—*
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Oldiges, John H.: *See—*
Chaney, David B.; Oldiges, John H.; and Milbourn, Bart L., 4,958,816, Cl. 269-328.000.

Olin Corporation: *See—*
Buenemann, Morris C., 4,958,568, Cl. 102-466.000.
Lickei, Donald L.; Rosin, Michael L.; and Shen, Ming, 4,959,156, Cl. 210-701.000.
Mandigo, Frank N., 4,958,569, Cl. 102-476.000.
Olson, Richard H., 4,958,567, Cl. 102-444.000.
Pennington, B. Timothy, 4,959,486, Cl. 549-532.000.

Olin Hunt Specialty Products Inc.: *See—*
Blakeney, Andrew J.; Sarubbi, Thomas; and Sizensky, Joseph J., 4,959,292, Cl. 430-165.000.
Buxton, Galina P.; and Shah, Harshad M., 4,959,661, Cl. 346-1.100.

Olivero, Alan G.: *See—*
Renga, James M.; Olivero, Alan G.; and Bosse, Mark, 4,959,488, Cl. 560-76.000.

Olsen, Gordon E.: *See—*
Effland, Richard C.; Klein, Joseph T.; Olsen, Gordon E.; and Davis, Larry, 4,959,377, Cl. 514-349.000.

Olson, John D., to Syntex (U.S.A.) Inc. Immunoseparating strip. 4,959,307, Cl. 435-7.000.

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Olympus Optical Co., Ltd.: *See—*
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Omaru, Atsuo: *See—*
Nishi, Yoshio; Azuma, Hideto; and Omaru, Atsuo, 4,959,281, Cl. 429-194.000.

Omote, Takuo: *See—*
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, 4,959,260, Cl. 428-255.000.

Omoto, Noriaki: *See—*
Kameoka, Fusahiro; Omoto, Noriaki; and Shogaki, Toshihiro, 4,959,625, Cl. 332-135.000.

Omron Tateisi Electronics Co.: *See—*
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, 4,959,788, Cl. 364-408.000.
Onomoto, Ryuichi; Nishikawa, Masato; Ishida, Masaji; and Arimoto, Sachiro, 4,958,825, Cl. 271-119.000.
Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, 4,958,936, Cl. 374-1.000.

Ondrla, Jeffrey M.: *See—*
Dunn, Harold K.; Lazzeri, Mark A.; and Ondrla, Jeffrey M., 4,959,066, Cl. 606-89.000.

O'Neal, Glenn B.; Baker, Quentin A.; Mecredy, Henry E., III; and Terna, Daniele, to Euros S.p.A. Fuel injection nozzle. 4,958,605, Cl. 123-300.000.

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Ono, Kazuhito: *See—*
Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, 4,958,685, Cl. 166-291.000.

Ono, Masatoshi: *See—*
Sato, Akira; and Ono, Masatoshi, 4,958,806, Cl. 256-12.500.

Ono, Tadashi: *See—*
Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.

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Iizumi, Makoto; Ide, Tatsumi; Kanzawa, Noboru; Sekiguchi, Akira; Morimoto, Masayuki; Goto, Hitoshi; and Ono, Tsutomu, 4,959,627, Cl. 335-106.000.

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Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.

Ooms, William J.: *See—*
Higgins, Robert J., Jr.; Ooms, William J.; and Irwin, James S., 4,959,624, Cl. 331-116.00R.

Ootani, Takayuki, to Kabushiki Kaisha Toshiba. Error preventing circuit. 4,959,560, Cl. 307-443.000.

Ootani, Takayuki, to Kabushiki Kaisha Toshiba. Error prevention circuit with capacitive means. 4,959,562, Cl. 307-443.000.

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Op Den Camp, Eckard, to Lucas Industries public limited company. Spot-type disc brake. 4,958,703, Cl. 188-73.310.

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Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.

Oppl, Othmar; Rupp, Wilhelm; and Wahhoud, Adnan, to Lindauer Dornier Gesellschaft GmbH. Air jet loom with a jacquard frame and a variable drawing-in width. 4,958,664, Cl. 139-435.100.

Oprysko, Modest M.: *See*—
Fan, Bunsen; Oprysko, Modest M.; and Rand, Ricky A., 4,959,540, Cl. 250-227.120.

Optische Werke G. Rodenstock: *See*—
Meizig, Manfred, 4,959,471, Cl. 544-71.000.

Ormat Turbines, Ltd.: *See*—
Regev, Mordechai, 4,958,988, Cl. 417-53.000.

Ortega, Agustin P. A.: *See*—
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.

Ortho Pharmaceutical Corporation: *See*—
Kung, Patrick C.; and Goldstein, Gideon, 4,959,458, Cl. 530-387.000.

Ortiz, Angel L., Jr., to General Electric Company. Multi-fiber holder for output coupler and methods using same. 4,958,900, Cl. 350-96.180.

Osada Electric Co., Ltd.: *See*—
Mori, Hidesobu, 4,958,423, Cl. 29-235.000.

Osada Research Institute, Ltd.: *See*—
Kojima, Toshio, 4,959,063, Cl. 606-15.000.

Osaka Titanium Co., Ltd.: *See*—
Yamamoto, Shigeo; and Noda, Toshio, 4,959,603, Cl. 320-1.000.

Osaka, Victor: *See*—
Chan, Mary K.; and Osaka, Victor, 4,958,454, Cl. 40-495.000.

Osborne, James J.: *See*—
Nebe, William J.; and Osborne, James J., 4,959,295, Cl. 430-281.000.

Oshima, Kunio: *See*—
Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.

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Oshima, Minoru: *See*—
Iino, Shinji; Oshima, Minoru; Kitoh, Shinya; and Kobayashi, Toshiaki, 4,959,104, Cl. 106-85.000.

O'Sullivan, Anthony C.: *See*—
Frei, Bruno; Mereyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.

Oswald, Richard: *See*—
Berg, Robin; Mohns, Lawrence; and Oswald, Richard, 4,958,957, Cl. 405-55.000.

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Yamamoto, Tadahiro; and Ota, Ken, 4,958,61[illegible], Cl. 123-478.000.

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Otake, Masaaki, to Sekisui-Iko Co., Ltd. Adhesive container/feeder. 4,958,748, Cl. 222-131.000.

Otsuki, Shinnichiro: *See*—
Ijuin, Kazuya; Otsuki, Shinnichiro; Nakano, Yuji; and Ogushi, Hiroshi, 4,959,536, Cl. 250-216.000.

Otsuki, Toshiaki: *See*—
Kawamura, Hideaki; Fujibayashi, Kentaro; and Otsuki, Toshiaki, 4,959,597, Cl. 318-568.150.

Ott, Guenter, to Siemens Aktiengesellschaft. Electrical component in chip structure and method for the manufacture thereof. 4,959,505, Cl. 174-52.200.

Ott, Karl H.: *See*—
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.

Ott, Karl-Heinz: *See*—
Eichenauer, Herbert; Leitz, Edgar; Ott, Karl-Heinz; Lindner, Christian; Meier, Lothar; and Billinger, Otto, 4,959,410, Cl. 525-67.000.
Lindner, Christian; Ott, Karl-Heinz; Wittmann, Dieter; and Braese, Hans-Eberhard, 4,959,418, Cl. 525-282.000.

Otto Bock Orthopadische Industrie Besitz-Und Verwaltungs - KG: *See*—
Horvath, Edward, 4,958,705, Cl. 188-314.000.

Outboard Marine Corporation: *See*—
Bland, Gerald F.; Freitag, Michael W.; and Mondek, Martin J., 4,959,033, Cl. 440-76.000.

Outokumpu Oy: *See*—
Harjunpaa, Harri J., 4,958,490, Cl. 60-274.000.

Owechko, Yuri; and Soffer, Bernard H., to Hughes Aircraft Company. Optical intensity-to-position mapping and light deflector apparatus and method. 4,958,914, Cl. 350-342.000.

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Owens, R. Larry; and McClellan, Paul G. Elastic patch for holes in walls. 4,959,251, Cl. 428-41.000.

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Oy Helo-Tehtaat-Helo Factories, Ltd.: *See*—
Kivimaa, Antti; and Perala, Reijo, 4,959,527, Cl. 219-365.000.

Oy Tampella AB: *See*—
Rautakorpi, Paavo; Lehtinen, Jukka; and Majaniemi, Pekka, 4,958,444, Cl. 34-71.000.

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Kunii, Toshinobu; Minami, Norio; Ozaki, Fumihiro; Mori, Nobuyuki; Takeda, Mikio; and Katoh, Hiroshi, 4,959,376, Cl. 514-338.000.

Ozaki, Keiichi: *See*—
Yamamoto, Masaki; Sato, Hisashi; and Ozaki, Keiichi, 4,959,018, Cl. 439-76.000.

Ozaki, Shinji: *See*—
Kochi, Mashanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.

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Ozawa, Tetsuo: *See*—
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Pahlman, John E.: *See*—
Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.

Pai, Damodar M.; Perry, Philip G.; and Pheilshifter, Kenneth J., to Xerox Corporation. Xeroradiographic imaging member. 4,959,287, Cl. 430-59.000.

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Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palanisamy, Ponnusamy, 4,959,751, Cl. 361-406.000.

Palazzotto, Michael C., to Minnesota Mining and Manufacturing Company. Ternary photoinitiator system for addition polymerization. 4,959,297, Cl. 430-322.000.

Palefsky, Howard: *See*—
Brunner, Maureen; and Palefsky, Howard, 4,959,205, Cl. 424-59.000.

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Cook, David C.; Hart, Terance W.; McLay, Iain M.; Palfreyman, Malcolm N.; Walsh, Roger J.; and Aloup, Jean-Claude, 4,959,385, Cl. 514-431.000.

Pall Corporation: *See*—
Degen, Peter J., 4,959,150, Cl. 210-638.000.

Palm, Bernhard, to Milwaukee Electric Tool Corporation. Self disengaging keyless chuck. 4,958,840, Cl. 279-62.000.

Palmer, Herbert A., to United States of America, Navy. Combustion efficiency analyzer, acoustic. 4,959,638, Cl. 340-577.000.

Palmer, Randall: *See*—
Hillstrom, David U.; Palmer, Randall; and Hillstrom, Brian J., 4,958,458, Cl. 40-156.000.

Palmert, Steven H.; and Ziems, Robert F., to Two-Part Foam Propellants, Inc. Disposable foam dispensing apparatus. 4,958,750, Cl. 222-135.000.

Pannel, John: *See*—
Huggins, Jack D.; and Pannel, John, 4,958,830, Cl. 272-69.000.

Pansiera, Timothy. Hinge joint. 4,958,643, Cl. 128-80.00H.

Pantini, Giovanni; and Savonelli, Susanna, to Ausimont S.r.l. Syndet soap cakes (soap bars) having improved properties. 4,959,171, Cl. 252-174.000.

Panunto, Thomas W.: *See*—
Etter, Margaret C.; Frankenbach, Gayle M.; and Panunto, Thomas W., 4,959,477, Cl. 546-307.000.

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Matzner, Markus; and Papuga, Donald M., 4,959,424, Cl. 525-471.000.

Parekh, Bharat S.; Link, William F.; and Coates, Stephen R., to Bio-Rad Laboratories, Inc. Filter canister for immunoassays. 4,959,197, Cl. 422-101.000.

Park, Ki D. Therapeutic bed. 4,958,627, Cl. 128-33.000.

Park, Kyung T.: *See*—
Thompson, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.

Park, You K., to Allied-Signal Inc. Content induced transaction overlap (CITO) block transmitter. 4,959,843, Cl. 375-59.000.

Parker, Julie W. Cocktail napkin. 4,958,798, Cl. 248-346.100.

Parker, Tim: *See*—
Tighe, Laurence E.; and Parker, Tim, 4,959,516, Cl. 219-10.55F.

Parker, William S. Low vision eye glasses. 4,958,924, Cl. 351-57.000.

Parks, Donald J. Extendable trailer apparatus. 4,958,845, Cl. 280-407.100.

Parnell, Margaret B.; Ashcraft, Thomas L., Jr.; and Webber, Kenneth M., to Exxon Production Research Company. Process for manufacturing disulfonate surfactants. 4,959,490, Cl. 562-74.000.

Parobek, Lubomir, to AXIC Inc. Apparatus for the measurement of the thickness and concentration of elements in thin films by means of X-ray analysis. 4,959,848, Cl. 378-46.000.

Parsons, Bryan N. V., to Jaguar Cars Limited. Mechanism for transmitting rotational motion from one shaft to another. 4,958,531, Cl. 74-63.000.

Partis, Richard A.: *See*—
Mueller, Richard A.; and Partis, Richard A., 4,959,364, Cl. 514-237.500.

Parzuchowski, Douglas A.: *See*—
Newton, George; and Parzuchowski, Douglas A., 4,958,543, Cl. 82-124.000.

Pascale, Carmine: *See*—
De Leonibus, Vittore; and Pascale, Carmine, 4,959,117, Cl. 156-497.000.

Pasman, Johannes H. T.; and Van Hijningen, Nicolaas C. J. A., to U.S. Philips Corporation. Record-carrier body provided with a relief structure of optically detectable servo-track portions and sector addresses and apparatus for forming said structure. 4,959,822, Cl. 369-44.110.

Pasztor, Andrew J., Jr.: *See*—
Seitz, Jerry T.; Berglund, Charles A.; and Pasztor, Andrew J., Jr., 4,959,435, Cl. 526-347.200.

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Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebi, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Patel, Ajitkumar G., to Dresser Industries, Inc. Pressure relief valve. 4,958,656, Cl. 137-467.000.

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Hirschmann, Walter, 4,959,591, Cl. 315-209.00R.

Patil, Ghanshyam; Matier, William L.; and Mai, Khuong H. X., to Du Pont de Nemours, E. I., and Company. Polyhydroxybenzyloxypropanolamines. 4,959,390, Cl. 514-522.000.

Peace, Steven L.; and Petrovic, John E., to Teledyne Industries, Inc. Water-powered oral hygiene device. 4,958,629, Cl. 128-66.000.

Pearson, Norman R.; Kleschick, William A.; and Carson, Christyn M., to Dow Chemical Company, The. 7-ethoxy-5-fluoromethyl-1,2,4-triazolo[1,5]-pyrimidine-2-sulfonamindes. 4,959,473, Cl. 544-263.000.

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Vaccaro, Angelo M.; and Morse, Robin C., 4,958,975, Cl. 414-259.000.

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Eckenhoff, James B.; Magruder, Judy A.; Cortese, Richard; Peery, John R.; and Wright, Jeremy C., 4,959,218, Cl. 424-473.000.

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Smiles, Kenneth A.; Peets, Edwin A.; and Tanner, Daniel J., 4,959,210, Cl. 424-85.700.

Penney, Carl M.; and Chande, Tushar S., to General Electric Company. Temperature measurement and control for photothermal processes. 4,959,244, Cl. 427-53.100.

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Rockwell, Davis A.; Lind, Richard C.; and Pepper, David M., 4,958,908, Cl. 350-311.000.

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Kivimaa, Antti; and Perala, Reijo, 4,959,527, Cl. 219-365.000.

Peralta, Noel C.: *See*—
Frenzel, Richard L.; and Peralta, Noel C., 4,959,178, Cl. 252-514.000.

Perfetti, Gary L., to Shell Oil Company. Apparatus for repairing brick-/refractory in a process heater. 4,959,012, Cl. 432-76.000.

Perrault, Ronald. Mobile work station for podiatrist. 4,958,963, Cl. 408-56.000.

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Pai, Damodar M.; Perry, Philip G.; and Pheilshifter, Kenneth J., 4,959,287, Cl. 430-59.000.

Persson, Lars-Olov, to Pressmaster Tool AB. Cable stripping tool. 4,958,433, Cl. 30-91.200.

Peter, Heinz; and Schurger, Rainer, to SKF GmbH. Axial rolling bearing. 4,958,947, Cl. 384-609.000.

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Peace, Steven L.; and Petrovic, John E., 4,958,629, Cl. 128-66.000.

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Pfaffhauser, Hans-Ulrich: *See*—
Haueter, Walter; Pfaffhauser, Hans-Ulrich; and Benz, Karl, 4,958,443, Cl. 34-57.00D.

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Reers, Martin; and Pfeiffer, Douglas R., 4,959,357, Cl. 514-103.000.

Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, to Sotralentz S.A. Process for making a plastic container by blow molding. 4,959,190, Cl. 264-516.000.

Pfizer Inc.: *See*—
Cross, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., 4,959,366, Cl. 514-239.500.
Francoeur, Michael L.; and Potts, Russell O., 4,959,365, Cl. 514-237.500.

Pfleiderer, Hans-Joerg: *See*—
Hosticka, Bedrich; Klinke, Roland; and Pfleiderer, Hans-Joerg, 4,959,621, Cl. 330-253.000.

Pheilshifter, Kenneth J.: *See*—
Pai, Damodar M.; Perry, Philip G.; and Pheilshifter, Kenneth J., 4,959,287, Cl. 430-59.000.

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Bagni, Anthony R.; Phillips, Larry G.; Darby, Ted A.; Naimpally, Saiprasad V.; and Burdick, William S., 4,959,716, Cl. 358-139.000.

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Houser, Clarence G., 4,958,578, Cl. 110-/ 6.000.

Physical Optics Corporation: *See*—
Jannson, Tomasz P.; and Jannson, Joanna L., 4,958,892, Cl. 350-3.600.

Picker International, Inc.: *See*—
Brovost, Terrence J.; Lampman, David A.; and Foster, Kenneth S., 4,959,611, Cl. 324-309.000.

Piera, Henri, to SEB S.A. Enamel coating charged with glass beads for the bottom of cooking utensils and utensils coated in this manner. 4,959,256, Cl. 428-144.000.

Piera, James: *See*—
Demaio, Richard; and Piera, James, 4,958,577, Cl. 108-43.000.

Pierre Fabre Medicament: *See*—
Yatzidis, Hippocrates, 4,959,175, Cl. 252-364.000.

Piesen, Stephan: *See*—
Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, 4,958,478, Cl. 53-415.000.

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Collins, Terence W., 4,958,560, Cl. 101-128.210.

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Nordquist, Andrew F.; and Pinschmidt, Robert K., Jr., 4,959,489, Cl. 360-170.000.

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Piros, Ionel. Theft proof protective covering for parked vehicle. 4,958,881, Cl. 296-98.000.

Pischtschan, Alfred: *See*—
Foltin, Eckard; Depcik, Hans-Werner; Huff, Karl; Pischtschan, Alfred; Yesildag, Mehmet C.; and Erkelenz, Reiner, 4,959,406, Cl. 524-413.000.
Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, 4,959,419, Cl. 525-301.000.

Pitney Bowes Inc.: *See*—
Dannatt, Hugh S.; Alesi, Thomas W., Jr.; and Kulpa, Walter J., 4,958,782, Cl. 242-75.430.
DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., 4,959,600, Cl. 318-625.000.

Pittway Corporation: *See*—
Greenebaume, James E., II, 4,958,757, Cl. 222-394.000.

Planells, Carlos C.: *See*—
Noguera, Angel R.; Planells, Carlos C.; and Itabashi, Masaki, 4,959,206, Cl. 424-70.000.

Plaschka, Reinhard: *See*—
Fuhrmann, Hartmut; and Plaschka, Reinhard, 4,958,564, Cl. 101-467.000.

Plath, Peter: *See*—
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,959,098, Cl. 71-95.000.

Pleasant, Ronald E. Inserts for injection mold machine. 4,959,002, Cl. 425-192.00R.

Pletsch, Hubert: *See*—
Wolf, Franz J.; and Pletsch, Hubert, 4,958,812, Cl. 267-294.000.

Plueguett, Ulrich: *See*—
Lohberg, Peter; May, Arno; Krause, Hans J.; Oberdorfer, Dietmar; and Plueguett, Ulrich, 4,958,937, Cl. 374-16.000.

Plummer, David D., to Andersen Corporation. Collapsible window flange apparatus. 4,958,469, Cl. 52-213.000.

Podd, George O.: *See*—
Mangler, Robert J.; Marsland, Anne J.; Podd, George O.; and Schweizer, Russell, 4,958,453, Cl. 40-352.000.

Podkowa, William J.; and Williams, Clark R., to Dallas Semiconductor Corporation. Dynamic PLA timing circuit. 4,959,646, Cl. 340-825.830.

Polcyn, Michael J.: *See*—
Hammond, Dwain H.; Cave, Ellis K.; and Polcyn, Michael J., 4,959,854, Cl. 379-157.000.

Pollina, Peter J. Brick supporting structures. 4,958,475, Cl. 52-712.000.

Polyplastics Co., Ltd.: *See*—
Nakane, Toshio; Kageyama, Yukihiko; and Hijikata, Kenji, 4,959,404, Cl. 524-267.000.

Polystr Limited: *See—*
Davis, Stephen C.; Fulton, Janet B.; and Hoang, Peter P. M., 4,959,420, Cl. 525-331.700.

Pontow, Hugo: *See—*
Braeger, Horst K. H.; and Pontow, Hugo, 4,958,409, Cl. 17-24.000.

Potje-Kamloth, Karin: *See—*
Josowicz, Mira; and Potje-Kamloth, Karin, 4,959,130, Cl. 204-32.100.

Potts, Russell O.: *See—*
Francoeur, Michael L.; and Potts, Russell O., 4,959,365, Cl. 514-237.500.

Pourahmady, Nasser: *See—*
Lewis, Charles M.; and Pourahmady, Nasser, 4,959,444, Cl. 528-170.000.

Powell, Kevin T.: *See—*
Weaver, James C.; Bliss, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail L, 4,959,301, Cl. 435-5.000.

Powell, William V., Jr.: *See—*
Kern, Ronald J.; Michel, Alan D.; and Powell, William V., Jr., 4,959,852, Cl. 379-70.000.

Powers, William B.: *See—*
Thompson, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., 4,959,807, Cl. 364-565.000.

PPG Industries, Inc.: *See—*
Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.
Misura, Michael S.; and Sare, Edward J., 4,959,429, Cl. 526-230.500.
Oates, Stephanie J.; and Sare, Edward J., 4,959,433, Cl. 526-314.000.

Prater, Paul L. Apparatus for covering drilling mud liquids in a surface depression. 4,958,449, Cl. 37-93.000.

Precision Cutters, Inc.: *See—*
Billingsley, John G. S., 4,958,987, Cl. 416-213.00A.

Preece, Alan W.; and Follett, Douglas H. Cell fusion apparatus. 4,959,321, Cl. 435-284.000.

Prees, Michael R.: *See—*
Salisbury, Richard S.; and Prees, Michael R., 4,959,791, Cl. 364-519.000.

Precision Porous Pipe, Inc.: *See—*
Mitchell, William S., 4,958,770, Cl. 239-145.000.

Pressmaster Tool AB: *See—*
Persson, Lars-Olov, 4,958,433, Cl. 30-91.200.

Presstek, Inc.: *See—*
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,562, Cl. 101-457.000.
Lewis, Thomas E.; Davidson, Bradley W.; Williams, Richard A.; Nowak, Michael T.; and Kline, John F., 4,958,563, Cl. 101-458.000.

Previdoli, Felix: *See—*
Mills, Lester; Mettler, Hans P.; Previdoli, Felix; and Moulin, Francois, 4,959,475, Cl. 544-324.000.

Price, Peter: *See—*
Acs, George; Christman, Judith K.; Price, Peter; Offensperger, Wolf; and Wahl, Silke, 4,959,323, Cl. 435-320.000.

Prime Computer, Inc.: *See—*
Ardini, Joseph L., Jr.; and Small, Steven, 4,959,771, Cl. 364-200.000.

Primtec: *See—*
Sorensen, Jens O., 4,959,005, Cl. 425-577.000.

Prince Corporation: *See—*
Kempkers, Gordon, 4,958,878, Cl. 296-97.500.

Pritchard, Parmely H.: *See—*
Nelson, Michael J. K.; Bourquin, Al W. J.; and Pritchard, Parmely H., 4,959,315, Cl. 435-167.000.

Procter & Gamble Company, The: *See—*
Heinzman, Stephen W.; Eis, Michael J.; and Armstrong, Molly P., 4,959,409, Cl. 525-61.000.
Spendel, Wolfgang U., 4,959,125, Cl. 162-158.000.

Proctor & Gamble Company, The: *See—*
Ryan, Leslie D., 4,959,204, Cl. 424-54.000.

Prodan, Richard S., to North American Philips Corporation. Method and apparatus for converting an interlaced television transmission to a sequential display using maximum likelihood estimation. 4,959,715, Cl. 358-140.000.

Prokopp, Manfred; and Kaufmann, Herbert, to Prokopp, Manfred. Electrical connecting apparatus for an electrical or electronic testing unit. 4,959,609, Cl. 324-158.00F.

Protek AG: *See—*
Morscher, Erwin W.; and Frey, Otto, 4,959,072, Cl. 623-22.000.

Przybylski, Steven A.: *See—*
Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., 4,959,779, Cl. 364-200.000.

Puckett, Lawrence J., to United States of America, Army. Continuous-fiber reinforcement sabot. 4,958,571, Cl. 102-522.000.

Purebl, Gyoray: *See—*
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Pusch, Richard H.: *See—*
Miller, Wilbur T.; Calamito, Dominic P.; and Pusch, Richard H., 4,958,663, Cl. 139-384.00R.

Putch, Samuel W., to Nelson, Norman A., a part interest. Subsea well completion system and method of operation. 4,958,686, Cl. 166-348.000.

Quad Research, Inc.: *See—*
MacGregor, Francis W., 4,959,628, Cl. 335-205.000.

Quality Chain Corp.: *See—*
Johnson, Eric, 4,958,415, Cl. 24-69.0TT.

Quate, Calvin F.: *See—*
Khri-Yakub, Butrus T.; Elrod, Scott A.; and Quate, Calvin F., 4,959,674, Cl. 346-140.00R.

Quentin, Jean-Pierre: *See—*
Bonnebat, Claude; Quentin, Jean-Pierre; and Moriu, Alain, 4,959,252, Cl. 428-64.000.

Quick, Edward E.: *See—*
Stautzenberger, Adin L.; Quick, Edward E.; and Lobo, Peter F., 4,959,449, Cl. 528-271.000.

R. A. Jones & Co., Inc.: *See—*
Rece, Wesley J.; Wildmoser, Martin M.; and Scarpa, Eric W., 4,958,667, Cl. 141-165.000.

R&G Sloane Manufacturing Co.: *See—*
Sixsmith, Thomas G., 4,958,857, Cl. 285-21.000.

Rabalais, Kevin: *See—*
Cadell, Theodore E.; and Rabalais, Kevin, 4,958,645, Cl. 128-903.000.

Rabaza, Maria V.: *See—*
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Rabbie, Judith: *See—*
Milburn, Gary L.; Rabbie, Judith; and Houts, Thomas M., 4,959,303, Cl. 435-7.000.

Rack, Timothy P.: *See—*
MacNeal, James R.; Rack, Timothy P.; and Corns, Ronald R., 4,959,101, Cl. 75-685.000.

Radomski, Thomas A., to General Motors Corporation. Alternating current generator. 4,959,577, Cl. 310-263.000.

Raghunathan, Yegnaswami: *See—*
Chow, San-Laung; and Raghunathan, Yegnaswami, 4,959,219, Cl. 424-480.000.

Ragsdale, George, to Natural Fibers Corp. Milkweed processing machine. 4,959,038, Cl. 460-149.000.

Rall, Ulrich: *See—*
Baehr, Bernd D.; Rall, Ulrich; van Delden, Hildegard; and Lillotte, Wolfgang, 4,959,075, Cl. 8-111.000.

Ramel, Urs A.; Allen, Michael P.; and Singh, Prithipal, to ChemTrak, Inc. Sample pad assay initiation device and method of making. 4,959,324, Cl. 436-169.000.

Ramirez, Frank D.: *See—*
DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., 4,959,600, Cl. 318-625.000.

Ramos, John A.: *See—*
Hoffman, Charles T., Jr.; Altenburger, John W.; and Ramos, John A., 4,958,654, Cl. 137-72.000.

Ramos, Josiane: *See—*
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.

Rand, Ricky A.: *See—*
Fan, Bunsen; Oprysko, Modest M.; and Rand, Ricky A., 4,959,540, Cl. 250-227.120.

Raneri, Joseph J., to Koch Industries, Inc. Multiple tube series membrane filtration module and method of preparing same. 4,959,149, Cl. 210-636.000.

Rao, Vinod: *See—*
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Rasinski, John E.; and Delong, Christian P., to Honeywell, Inc. System and simulator for in-flight threat and countermeasures training. 4,959,015, Cl. 434-2.000.

Rasinski, Michael J.: *See—*
Snuttjer, Owen R.; and Rasinski, Michael J., 4,959,569, Cl. 310-53.000.

Rastergraphics Inc.: *See—*
Gardner, Deane; and Fellingham, George, 4,959,040, Cl. 474-103.000.

Rath, Hans P.: *See—*
Martischius, Franz-Dieter; Rath, Hans P.; Vogel, Hans-Henning; Greif, Norbert; Oppenlaender, Knut; Denzinger, Walter; and Hartmann, Heinrich, 4,959,077, Cl. 44-62.000.

Rau, Georg; and Budert, Gunter H., to Georg Knoblauch, Firma. Slide-top drill-bit storage box. 4,958,732, Cl. 206-379.000.

Rautakorpi, Paavo; Lehtinen, Jukka; and Majaniemi, Pekka, to Oy Tampella AB. Apparatus for drying a fibre web. 4,958,444, Cl. 34-71.000.

Raven Industries, Inc.: *See—*
Koch, Mark A., 4,958,565, Cl. 102-386.000.

Ravi, Prasad S.; Kickle, Hunter L.; McCurry, Patrick M.; and Skogberg, David J., to Henkel Kommanditgesellschaft auf Aktien. Color stabilization method for glycoside products. 4,959,468, Cl. 536-127.000.

Rawski, John M., to Honeywell, Inc. Optical slip ring. 4,958,904, Cl. 350-96.200.

Raynet Corporation: *See—*
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.

Raytheon Company: *See—*
Deerfield, Alan J.; and Siu, Sun-Chi, 4,959,776, Cl. 364-200.000.

RCA Licensing Corporation: *See*—
Duffield, David J.; and Beyers, Billy W., Jr., 4,959,720, Cl. 358-191.100.
Re, Alberto; and De Giorgi, Marco, to Ausimont S.r.l. Epoxy resins prepared by co-curing fluorinated epoxy prepolymers and non-fluorinated epoxy prepolymers. 4,959,426, Cl. 525-527.000.
Rece, Wesley J.; Wildmoser, Martin M.; and Scarpa, Eric W., to R. A. Jones & Co., Inc. Tube holder for tube filling machines. 4,958,667, Cl. 141-165.000.
Reckemeier, Hartwig: *See*—
Bonifer, Edgar; Duttine, Walter; and Reckemeier, Hartwig. 4,958,723, Cl. 198-781.000.
Red Arrow Products Company, Inc.: *See*—
Underwood, Gary, 4,959,232, Cl. 426-271.000.
Reddy, Malireddy S.; Mullen, John; Washam, Clinton J.; Brown, C. Gordon; and Hunt, Charles C. Cheese manufacture. 4,959,229, Cl. 426-39.000.
Redford, Chris R., to Upjohn Company, The. Inclined bucket elevator. 4,958,721, Cl. 198-710.000.
Reed, Mark A.: *See*—
Fressley, William R.; and Reed, Mark A., 4,959,696, Cl. 357-16.000.
Reers, Martin; and Pfeiffer, Douglas R., to University of Minnesota, Regents of the. Phospholipase A2 inhibitor. 4,959,357, Cl. 514-103.000.
Rees, Lilias G.: *See*—
Wood, Hamish C. S.; Suckling, Colin J.; and Rees, Lilias G., 4,959,472, Cl. 544-258.000.
Rees, Richard: *See*—
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.
Regev, Mordechai, to Ormat Turbines, Ltd. Motor driven pump for pumping viscous solutions. 4,958,988, Cl. 417-53.000.
Reichow, Franz: *See*—
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Chakrabarti, Paritosh M.; Denison, John M.; Johnson, Harlan B.; Korach, Malcolm; Leatherman, Dennis D.; Reinhardt, Linda P.; Schwarz, Richard A.; and Simmons, Robert B., 4,959,208, Cl. 424-78.000.
Reinherz, Barry P., to Ciba-Geigy Corporation. Glass enamel coating compositions. 4,959,090, Cl. 65-60.400.
Reinke, Paul E.: *See*—
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Reis, John C.: *See*—
Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.
Reliance Comm/Tec Corporation: *See*—
Bu-Abbud, George, 4,958,926, Cl. 356-73.100.
Rembrandt Photo Services: *See*—
Shipp, Robert D., 4,958,855, Cl. 281-45.000.
Remond, Georges: *See*—
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Renbutsu, Tadashi: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.
Renga, James M.; Olivero, Alan G.; and Bosse, Mark, to Henkel Research Corporation. Polyfunctional hexasubstituted benzene derivatives. 4,959,488, Cl. 560-76.000.
Renishaw Plc: *See*—
Stephens, William F. N., 4,959,542, Cl. 250-237.00G.
Renouard, Bruce T. Water ski safety apparatus. 4,958,583, Cl. 114-253.000.
Reuter, Horst: *See*—
Brenner, Heinz; and Reuter, Horst, 4,958,811, Cl. 267-140.100.
Rexnord Kette GmbH & Co. KG: *See*—
Fett, Jurgen; Oelschlager, Karl G.; and Bannert, Wolfgang, 4,958,726, Cl. 198-852.000.
Reynolds, Fred W., to Sol Gingi-Pak, A Division of Belport Co., Inc. Recycling, liquid medium temperature altering apparatus. 4,959,013, Cl. 433-35.000.
Reynolds, Samuel D., Jr., to Westinghouse Electric Corp. Method of welding stainless steel studs. 4,959,518, Cl. 219-99.000.
Rheinhold & Mahla GmbH: *See*—
Schafhaupt, Horst, 4,958,700, Cl. 181-218.000.
Rhodes, Kenneth R.: *See*—
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Rhodia AG: *See*—
Dollhope, Rudiger; and Nandzik, Bernd, 4,959,186, Cl. 264-102.000.
Rhone-Poulenc Chimie: *See*—
Bonnebat, Claude; Quentin, Jean-Pierre; and Morin, Alain, 4,959,252, Cl. 428-64.000.
Rich, Jonathan D.; Gross, David C.; Burnell, Timothy B.; and Wengrovius, Jeffrey H., to General Electric Company. RTV silicones having bis(ureido)silane chain extenders and aminoxy siloxane cross-linkers. 4,959,407, Cl. 524-425.000.
Richardson, Donald G.; and Cazort, John G. Adjustable shock absorbers. 4,958,706, Cl. 188-319.000.
Richman, Elaine A.; and Fish, Darrell D., to Richman, Elaine A. Disposable bird feeder. 4,958,595, Cl. 119-52.200.
Ricoh Company, Ltd.: *See*—
Aruga, Tamotsu; Sasaki, Masaomi; and Hashimoto, Mitsuru, 4,959,290, Cl. 430-73.000.
Kaneko, Tamaki, 4,958,827, Cl. 271-176.000.
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.
Satoh, Tsumori, 4,959,691, Cl. 355-246.000.
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Riegel, Ulrich: *See*—
Engelhardt, Friedrich; Riegel, Ulrich; Gerndorf, Joachim; and Kleiner, Hans-Jerg, 4,959,441, Cl. 558-161.000.
Rieter Machine Works, Ltd.: *See*—
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Rijnbeek, Antonius G.: *See*—
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Rinderer, Eric R., to B-Line Systems, Inc. Clip for supporting conduit and the like. 4,958,792, Cl. 248-74.200.
Riordan, Thomas J.: *See*—
Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., 4,959,779, Cl. 364-200.000.
Rivenson, Scholein: *See*—
Lombardo, Jorge H.; Smolko, Eduardo E.; Ugalde, Rodolfo A.; and Rivenson, Scholein, 4,959,211, Cl. 424-93.000.
Rivi, Aldino: *See*—
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Robarge, Dean A.; Morby, John A.; M'Sadoques, Andre J.; and Markowski, Robert G., to General Electric Company. Fusible electric switch. 4,959,514, Cl. 200-144.00R.
Roberg, Paul J. Protective holder for holding thin or substantially thin items. 4,958,450, Cl. 40-159.000.
Robert Bosch GmbH: *See*—
Bruggen, Gerhard; Keiper, Winfried; and Steinke, Leo, 4,958,515, Cl. 73-116.000.
Griese, Klaus; Jons, Claus; Muller, Karl-Heinz; Muller, Rudolf; and Muhlbauer, Werner, 4,958,994, Cl. 418-132.000.
Kubbauch, Gerd, 4,958,405, Cl. 15-250.330.
Roberts, Frank L., to Bio-Support Industries Ltd. Therapeutic temperature pack. 4,958,635, Cl. 128-403.000.
Roberts, Gary D., to S.P.C. Holding, Co., Ltd. Electromagnetic induction machines having regulated polar magnetic symmetry. 4,959,573, Cl. 310-68.00R.
Roberts, John V. H., to Rodel, Inc. Method and composition for polishing metal surfaces. 4,959,113, Cl. 156-636.000.
Roberts, Victor D.: *See*—
Anderson, John M.; and Roberts, Victor D., 4,959,592, Cl. 315-248.000.
Robertshaw Controls Company: *See*—
Shopsky, Harvey J., 4,958,801, Cl. 251-11.000.
Robertson, Charles W., Jr., to Du Pont de Nemours, E. I., and Company. Apparatus for monitoring thickness variations in a film web. 4,958,930, Cl. 356-357.000.
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Robinson, Keith M.; Mao, Simon J. T.; and Jackson, Richard L., to Merrell Dow Pharmaceuticals Inc. Method of treating diabetes mellitus. 4,959,392, Cl. 514-712.000.
Rocco, Francesco. Protective device for endoscopists, in particular for urethral use. 4,958,623, Cl. 128-7.000.
Rochester, James R., to Hughes Aircraft Company. Annular optical fiber support with radial gas jets. 4,958,899, Cl. 350-96.200.
Rockafeller, Eugene F.: *See*—
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Rockwell, Davis A.; Lind, Richard C.; and Pepper, David M., to Hughes Aircraft Company. Bandwidth-preserving brillouin phase conjugate mirror and method. 4,958,908, Cl. 350-311.000.
Rockwell International Corporation: *See*—
Frantz, William, 4,958,989, Cl. 417-222.000.
Rodel, Inc.: *See*—
Roberts, John V. H., 4,959,113, Cl. 156-636.000.
Rodgers, David L. Apparatus to discourage supine sleep. 4,958,64[illegible]3. 128-871.000.
Roeper, Harald W. W.: *See*—
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Roeske, Robert G.: *See*—
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Rogers, John J.: *See*—
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Rogers, Steven: *See*—
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Rogers, W. Leslie; and Clinthorne, Neal H., to University of Michigan, The. Multiple sensor position locating system. 4,959,809, Cl. 364-581.000.
Rogers, William C.: *See*—
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Rohm Co., Ltd.: *See*—
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Rohrbacher, Frank; Spain, Patrick L.; and Fahlsing, Roger A., to Du Pont de Nemours, E. I., and Company. Process for forming a com-

posite structure of thermoplastic polymer and sheet molding compound. 4,959,189, Cl. 264-510.000.

Rolffs, Philip C. Synthetic rosewood and method of production thereof. 4,959,076, Cl. 8-402.000.

Roman, Bernard J.; and Muller, Richard E., to Siemens Aktiengesellschaft. Fabricating T-gate MESFETS employing double exposure, double develop techniques. 4,959,326, Cl. 437-40.000.

Rorer Pharmaceutical Corporation: *See*—
Youssefyeh, Raymond D.; Campbell, Henry F.; and Kuhla, Donald E., 4,959,485, Cl. 549-461.000.

Rose, James D.; and Suder, William H., III, to United States of America, Navy. Graduated-load spring washer system for screws and threaded fasteners. 4,958,970, Cl. 411-12.000.

Rosemount Inc.: *See*—
Schwartz, Bradley N.; Kugler, Stanley; and Selg, Donald W., 4,958,938, Cl. 374-208.000.

Rosenbluth, Robert F.; and Cox, Brian J., to Advanced Surgical Intervention, Inc. Method and apparatus for treating impotence. 4,958,630, Cl. 128-79.000.

Rosenfeld, Jerold C., to Celanese Corporation. Preparation of gray to blue aromatic polyesters by incorporation of cobalt into the catalyst system. 4,959,445, Cl. 528-181.000.

Rosenson, Andrew S. Apparatus for decorating an eyeglass frame. 4,958,923, Cl. 351-52.000.

Rosin, Michael L.: *See*—
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Rossi, Anna M.: *See*—
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Rossi, Cristiano, to Chrysler Corporation. Transparent pressure foot. 4,959,522, Cl. 219-121.750.

Roussel, Keith M.: *See*—
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Rowley, Gerald L.: *See*—
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Rowson, Graham: *See*—
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.

Rubinstein, Jos; and Klingman, Kenneth C., to Stardent Computer, Inc. System for assigning interrupts to least busy processor that already loaded same class of interrupt routines. 4,959,781, Cl. 364-200.000.

Ruby, Joseph H., to Honeywell Inc. Power saving electromagnetic deflection display system for dual mode deflection amplifier. 4,959,594, Cl. 315-397.000.

Ruckel, Erwin R.: *See*—
Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., 4,959,412, Cl. 525-98.000.

Rueb, Lothar: *See*—
Schwalge, Barbara; Plath, Peter; Eicken, Karl; Rueb, Lothar; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,959,098, Cl. 71-95.000.

Ruiz, Arthur; and Spector, George. Easily removeable battery terminal. 4,959,031, Cl. 439-759.000.

Rupp, Wilhelm: *See*—
Oppl, Othmar; Rupp, Wilhelm; and Wahhoud, Adnan, 4,958,664, Cl. 139-435.100.

Rusch, Reinhart: *See*—
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.

Rushton, Robert C., Jr. Hair dressing headband. 4,958,385, Cl. 2-174.000.

Russell, Faye Y. Travel game with a game board display screen and electronic card reader. 4,958,837, Cl. 273-237.000.

Russell, Peter G., to Morton Thiokol Inc. Method for lining the inner surface of a cylindrical or domed cylindrical member with an elastomeric material. 4,959,110, Cl. 156-187.000.

Rutherford, Peter M.: *See*—
Bass, Martin L.; and Rutherford, Peter M., 4,959,641, Cl. 340-700.000.

Rutishauser, Albert; and Rutishauser, Thomas, to Rutishauser Data AG. Sheet feeders. 4,958,822, Cl. 271-9.000.

Rutishauser Data AG: *See*—
Rutishauser, Albert; and Rutishauser, Thomas, 4,958,822, Cl. 271-9.000.

Rutishauser, Thomas: *See*—
Rutishauser, Albert; and Rutishauser, Thomas, 4,958,822, Cl. 271-9.000.

Ryan, Leslie D., to Proctor & Gamble Company, The. Oral compositions. 4,959,204, Cl. 424-54.000.

Ryan, Timothy J. Power rain gutter cleaning tool. 4,958,397, Cl. 15-93.100.

Ryer, Robert F., II: *See*—
Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., 4,959,051, Cl. 604-77.000.

Ryobi Ltd.: *See*—
Aoki, Atsuhito, 4,958,785, Cl. 242-295.000.
Miyamoto, Kouichi, 4,958,544, Cl. 83-471.300.

S.P.C. Holding, Co., Ltd.: *See*—
Roberts, Gary D., 4,959,573, Cl. 310-68.00R.

Sacks, Jack M.: *See*—
Lo, Thomas K.; Sacks, Jack M.; and Simoni, Wayne P., 4,959,714, Cl. 358-125.000.

Sadamitsu, Hitoshi: *See*—
Kondo, Megumu; Kamiya, Shuji; Fukuoka, Kazuhiko; Shinozaki, Masatsugu; and Sadamitsu, Hitoshi, 4,959,770, Cl. 364-200.000.

Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, to Nihon Parkerizing Co., Ltd.; and Mitsubishi Kasei Corporation. Process for treating plated steel sheet. 4,959,277, Cl. 428-623.000.

Saeki, Takao: *See*—
Kuwabara, Yasuo; Fujie, Naofumi; and Saeki, Takao, 4,959,579, Cl. 310-323.000.

Saffert, Ralf; and Schilling, Albert, to Carl-Zeiss-Stiftung. Microscope arranged for measuring microscopic structures. 4,959,552, Cl. 250-560.000.

Sago, Akira: *See*—
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.

Sahashi, Masashi: *See*—
Hasegawa, Michio; and Sahashi, Masashi, 4,959,631, Cl. 336-83.000.

Saiki, Noritsugu: *See*—
Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, 4,959,442, Cl. 528-168.000.

St. Onge, Henri S., to Duratron Systems Limited. Method of relining sewers and water lines without excavation. 4,958,959, Cl. 405-184.000.

Saito, Akihiko; and Yukawa, Hideki, to Kokusan Denki Company, Ltd. Ignition system for internal combustion engine. 4,958,608, Cl. 123-427.000.

Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokoshi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, to Fuji Photo Film Co., Ltd. Method and apparatus for continuous melting of gelled substance. 4,958,934, Cl. 366-145.000.

Saito, Katsuyuki: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Saito, Keizo: *See*—
Yamamoto, Yasushi; and Saito, Keizo, 4,959,785, Cl. 364-419.000.

Saito, Kouichi: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.

Saito, Mitsuo: *See*—
Mori, Akio; Aikawa, Takeshi; and Saito, Mitsuo, 4,959,871, Cl. 382-59.000.

Saito, Naomasa, to Minolta Camera Kabushiki Kaisha. Sheets handling device. 4,958,828, Cl. 271-186.000.

Saito, Susumu; and Arimoto, Akira, to Hitachi Koki Co., Ltd.; and Hitachi, Ltd. Laser printer with harmonic wave separation of the beam. 4,959,665, Cl. 346-108.000.

Saito, Yoichi: *See*—
Aikawa, Satoru; and Saito, Yoichi, 4,959,834, Cl. 371-47.100.

Saitoh, Toshio; Takahashi, Noriyoshi; and Satoh, Masaki, to Hitachi, Ltd. Transpositioned multi-strand conductor for electric rotary machine. 4,959,575, Cl. 310-213.000.

Sakabe, Yukio: *See*—
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, 4,959,333, Cl. 501-136.000.

Sakagami, Teruo: *See*—
Watanabe, Nobuhiro; and Sakagami, Teruo, 4,959,431, Cl. 526-261.000.

Sakai, Akira: *See*—
Nakagawa, Katsumi; Kanai, Masahiro; Ishihara, Shunichi; Arao, Kozo; Fujioka, Yasushi; Sakai, Akira; and Murakami, Tsutomu, 4,959,106, Cl. 136-258.000.

Sakai, Kenji: *See*—
Mori, Sanae; Sakamoto, Masaaki; Yamamoto, Koichi; and Sakai, Kenji, 4,959,274, Cl. 428-555.000.

Sakai, Mari, to W. L. Gore & Associates, Inc. Culturing apparatus. 4,959,322, Cl. 435-311.000.

Sakakibara, Hiroshi: *See*—
Horibe, Mitsutoshi; Hamada, Hiroshi; and Sakakibara, Hiroshi, 4,959,576, Cl. 310-239.000.

Sakakibara, Susumu: *See*—
Hayashi, Yuji; Sakakibara, Susumu; and Maeda, Katsumi, 4,959,692, Cl. 355-253.000.

Sakama, Mitsunori: *See*—
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.

Sakamaki, Hiroshi; Horikoshi, Yukio; Jinnouchi, Takeshi; and Tanzawa, Kenji, to Eagle Industry Co., Ltd. Vane pump with annular recesses to control vane extension. 4,958,995, Cl. 418-152.000.

Sakamoto, Kiichiro: *See*—
Otake, Katsumi; Sakamoto, Kiichiro; and Kogane, Mikio, 4,959,683, Cl. 355-28.000.

Sakamoto, Masaaki: *See*—
Mori, Sanae; Sakamoto, Masaaki; Yamamoto, Koichi; and Sakai, Kenji, 4,959,274, Cl. 428-555.000.

Sakamoto, Naoya: *See*—
Yamazaki, Shunpei; Fukada, Takeshi; Sakama, Mitsunori; Shinohara, Hisato; Amachi, Nobumitsu; Sakamoto, Naoya; and Inuzima, Takashi, 4,959,533, Cl. 250-208.100.

Sakamoto, Tamaki; Kobayashi, Toshiyuki; Yamamoto, Norihito; and Miyake, Tamio, to Omron Tateisi Electronics Co. Electric thermometer. 4,958,936, Cl. 374-1.000.

Sakamoto, Tomoyuki: *See*—
Nambu, Masao; Watari, Tsutomu; Sakamoto, Tomoyuki; and Akojima, Kazuo, 4,958,626, Cl. 128-24.00A.

Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, to Fuji Photo Film Co., Ltd. Silver halide color photographic materials. 4,959,299, Cl. 430-544.000.

Sakata, Kazuhiro: *See*—
Yoneda, Kenzi; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.

Sakata, Tsutomu: *See*—
Takeuchi, Hideharu; and Sakata, Tsutomu, 4,959,509, Cl. 174-153.00G.

Sakurada, Nobuaki: *See*—
Sasaki, Takashi; Sakurada, Nobuaki; and Kawamura, Hideaki, 4,959,659, Cl. 346-1.100.

Salazar, Edilberto I.: *See*—
DiGiulio, Peter C.; Bergman, Norman J.; Ramirez, Frank D.; and Salazar, Edilberto I., 4,959,600, Cl. 318-625.000.

Salim, Aws S. M. Synergistic combinations. 4,959,369, Cl. 514-264.000.

Salisbury, Richard S.; and Prees, Michael R., to Amansol Enterprises No. 17 Ltd. Control system for enhancing gray tones of a digitally operated printer. 4,959,791, Cl. 364-519.000.

Sallman, Alfred: *See*—
Baschang, Gerhard; and Sallman, Alfred, 4,959,394, Cl. 514-555.000.

Salomon S.A.: *See*—
Dufour, Pierre, 4,958,418, Cl. 24-713.600.

Salzgitter Maschinenbau GmbH: *See*—
Cyphelly, Ivan J., 4,958,690, Cl. 175-296.000.

Samad, Tariq, to Honeywell Inc. Centering scheme for pattern recognition. 4,958,939, Cl. 382-35.000.

Samarov, Victor M.; Doumani, George A., Jr.; and Becker, Philip F., to Digital Equipment Corporation. Electronic module RFI/EMI shielding. 4,959,752, Cl. 361-424.000.

Sammells, Anthony F.: *See*—
Cook, Ronald L.; and Sammells, Anthony F., 4,959,131, Cl. 204-59.00R.

Sampson, Craig F.: *See*—
Boyle, Dennis J.; and Sampson, Craig F., 4,958,889, Cl. 312-208.000.

Samsung Electronics Co., Ltd.: *See*—
Cho, Soo I.; and Choi, Si D., 4,959,814, Cl. 365-207.000.

Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., to Antibioticos, S.A. Vectors and method of *penicillium chrysogenum* transformation. 4,959,327, Cl. 435-172.300.

Sanden Corporation: *See*—
Kikuchi, Kazuto, 4,958,991, Cl. 418-55.600.

Sanders, Lynda M.; and Domb, Abraham, to Syntex (U.S.A.) Inc. Delayed/sustained release of macromolecules. 4,959,217, Cl. 424-473.000.

Sandstrom, Richard L.: *See*—
Akins, Robert P.; Larson, Donald G.; Sengupta, Uday K.; and Sandstrom, Richard L., 4,959,840, Cl. 372-57.000.

Sanger, Gregory M.: *See*—
Hess, Arthur E.; and Sanger, Gregory M., 4,958,463, Cl. 51-72.00R.

San Soucie, Marc D.: *See*—
Cooper, James L.; and San Soucie, Marc D., 4,959,769, Cl. 364-200.000.

Santa Fe Braun Inc.: *See*—
Grotz, Bernard J.; and Frankini, Vito, 4,959,079, Cl. 48-198.700.

Sanyo Electric Co., Ltd.: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Sato, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.

Sapienza, Michael A.: *See*—
Toal, Hugh F.; Careyote, Nicholas J.; and Sapienza, Michael A., 4,958,399, Cl. 15-104.00S.

Sardi, William F.: *See*—
Seder, Edmund V.; and Sardi, William F., 4,959,048, Cl. 604-9.000.

Sare, Edward J.: *See*—
Misura, Michael S.; and Sare, Edward J., 4,959,429, Cl. 526-230.500.
Oates, Stephanie J.; and Sare, Edward J., 4,959,433, Cl. 526-314.000.

Sarkozi, Jeff. Self adjusting, soft neck support collar. 4,958,631, Cl. 128-87.00B.

Sarma, Dwadasi H. R.: *See*—
Hearn, John A.; Schwarz, Dwight L.; Sarma, Dwadasi H. R.; and Palaniamy, Ponnusamy, 4,959,751, Cl. 361-406.000.

Sarubbi, Thomas: *See*—
Blakeney, Andrew J.; Sarubbi, Thomas; and Sizensky, Joseph J., 4,959,292, Cl. 430-165.000.

Saruta, Makoto; and Suzuki, Tatsuhiro, to NCR Corporation. Optical wireless communication system. 4,959,874, Cl. 455-601.000.

Saruta, Masahiro: *See*—
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, 4,959,438, Cl. 528-98.000.

Sasagawa, Katsuyoshi: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Sasajima, Koji: *See*—
Maki, Kazuya; Ishikawa, Yoshikazu; Yamaguchi, Kouji; and Sasajima, Koji, 4,958,492, Cl. 60-327.000.

Sasaki, Fujio: *See*—
Masuda, Isao; Tacono, Toshio; and Sasaki, Fujio, 4,958,745, Cl. 220-375.000.

Sasaki, Hiroaki: *See*—
Ohouchi, Junichi; Sasaki, Hiroaki; and Hasegawa, Kazuo, 4,959,805, Cl. 364-562.000.

Sasaki, Junso: *See*—
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatase, Fumio, 4,958,606, Cl. 123-316.000.

Sasaki, Masahiko: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Sasaki, Masaomi: *See*—
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Sasaki, Tadayuki: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Sasaki, Takashi; Sakurada, Nobuaki; and Kawamura, Hideaki, to Canon Kabushiki Kaisha. Color picture forming apparatus and method. 4,959,659, Cl. 346-1.100.

Sato, Akio; and Okada, Kazuo, to Fuji Photo Film Co., Ltd. Still video signal playback apparatus for converting an input video signal into a noise cancelled, drop-out compensated playback signal. 4,959,732, Cl. 358-336.000.

Sato, Akira; and Ono, Masatoshi, to Nihon Samicon Co., Ltd. Snowstorm guard fence structures and jet roofs. 4,958,806, Cl. 256-12.500.

Sato, Hisashi: *See*—
Yamamoto, Masaki; Sato, Hisashi; and Ozaki, Keiichi, 4,959,018, Cl. 439-76.000.

Sato, Katsutoshi: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

Sato, Kazuhiko: *See*—
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Sato, Kazuo: *See*—
Frei, Bruno; Mereyala, Hari B.; O'Sullivan, Anthony C.; Sato, Kazuo; and Yanai, Toshiaki, 4,959,386, Cl. 514-450.000.

Sato, Koji: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.

Sato, Kunio: *See*—
Minamitaka, Junichi; Sato, Kunio; and Ino, Mayumi, 4,958,552, Cl. 84-603.000.

Sato, Noboru: *See*—
Matsuoka, Isamu; and Sato, Noboru, 4,959,137, Cl. 204-299.00EC.

Sato, Takashi: *See*—
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokori, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.

Sato, Toshifumi, to NEC Corporation. Paging receiver with a display function that inhibits display of a received command signal. 4,959,644, Cl. 340-825.440.

Satoh, Masaki: *See*—
Saitoh, Toshio; Takahashi, Noriyoshi; and Satoh, Masaki, 4,959,575, Cl. 310-213.000.

Satoh, Shinji; Isomichi, Kanji; Ogawa, Hiroshi; Yamashita, Toshio; and Funahashi, Nobuhiro, to Mitsubishi Jukogyo K.K. Controller for a refrigeration unit. 4,958,502, Cl. 62-126.000.

Satoh, Shuichi; and Tsuji, Kazuwo, to Sumitomo Electric Industries, Ltd. Green diamond and method of producing the same. 4,959,201, Cl. 423-446.000.

Satoh, Tsumori, to Ricoh Company, Ltd. Magnetic brush forming device for image generating apparatus. 4,959,691, Cl. 355-246.000.

Saturn Corporation: *See*—
Diehl, Rodney A.; Uhrman, Robert L., Jr.; Bishop, Robert G.; and Campbell, Donald B., 4,958,537, Cl. 74-606.00R.
Pinch, William D.; Dolengowski, Douglas A.; Longard, R. Kevin; and Gopwani, Raj K., 4,958,849, Cl. 280-668.000.

Sauer, Brian L., to Du Pont de Nemours, E. I., and Company. Site-specific recombination of DNA in eukaryotic cells. 4,959,317, Cl. 435-172.300.

Sauer, Harry: *See*—
Droadziok, Armin; Sauer, Harry; and Zoerner, Walter, 4,958,679, Cl. 165-13.000.

Sauerbier, Dieter; Isaac, Otto; and Brade, Wolfgang P., to Asta Pharma AG. Ifosfamide-isosna lyophilizate and process for its preparation. 4,959,215, Cl. 424-422.000.

Savage, Donald S.: *See*—
Denham, Keith; Savage, Donald S.; and Shortland, John A., 4,958,510, Cl. 72-391.400.

Savio S.p.A.: *See*—
Colli, Luici; Badiali, Roberto; and Marangone, Nereo, 4,958,779, Cl. 242-035.60R.

Savonelli, Susanna: *See*—
Pantini, Giovanni; and Savonelli, Susanna, 4,959,171, Cl. 252-174.000.

Sawyer, Willard H.: *See*—
Cody, Ian A.; Hamner, deceased Glen P.; Sawyer, Willard H.; Sawyer, Willard H.; and Davis S. Mark, 4,959,337, Cl. 502-230.000.
Cody, Ian A.; Hamner, deceased Glen P.; Sawyer, Willard H.; Sawyer, Willard H.; and Davis S. Mark, 4,959,337, Cl. 502-230.000.

Scarpa, Eric W.: *See*—
Rece, Wesley J.; Wildmoser, Martin M.; and Scarpa, Eric W., 4,958,667, Cl. 141-165.000.

Schaap, Arthur P., to Board of Governors of Wayne State University. Method and compositions providing enhanced chemiluminescence from 1,2-dioxetanes. 4,959,182, Cl. 252-700.000.

Schaffer, Irving, to Luxo Lamp Corporation. Magnifier lens assembly. 4,958,913, Cl. 350-252.000.

Schaffers, Frederik J.: *See*—
Van Nes, Floris L.; Leopold, Frederik F.; and Schaffers, Frederik J., 4,959,864, Cl. 381-43.000.

Schafhaupt, Horst, to Rheinhold & Mahla GmbH. Protective facility for suppressing noise produced at high gas flows by engines installed on aircraft. 4,958,700, Cl. 181-218.000.

Scharrer, Roland P. F.: *See*—
Arter, William J.; Chu, Wayne K.; Ruckel, Erwin R.; and Scharrer, Roland P. F., 4,959,412, Cl. 525-98.000.

Schauder, Colin D.: *See*—
Scott, Kenneth C.; and Schauder, Colin D., 4,959,602, Cl. 318-803.000.

Scheib, Thomas J.: *See*—
Buchner, Marc; Lane, John D.; Loparo, Ken; and Scheib, Thomas J., 4,959,767, Cl. 364-151.000.

Scheldorf, Gary O.: *See*—
Gordon, James F.; Scheldorf, Owen H.; and Scheldorf, Gary O., 4,958,990, Cl. 417-410.000.

Scheldorf, Owen H.: *See*—
Gordon, James F.; Scheldorf, Owen H.; and Scheldorf, Gary O., 4,958,990, Cl. 417-410.000.

Schellhorn, Verne L., to Halliburton Company. Methods of modifying the structural integrity of subterranean earth situs. 4,958,962, Cl. 405-267.000.

Schenck, Stephen R., to Texas Instruments Incorporated. Adjustable low noise output circuit. 4,959,563, Cl. 307-448.000.

Schenk, Richard C., to Xerox Corporation. Damped binding apparatus. 4,958,974, Cl. 412-37.000.

Scherer, Angela: *See*—
Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.

Schering Aktiengesellschaft: *See*—
Berwald, Ernst; and Lewe, Winfried, 4,958,742, Cl. 220-209.000.
Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, 4,959,094, Cl. 71-92.000.
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Schering Corporation: *See*—
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Schilling, Albert: *See*—
Saffert, Ralf; and Schilling, Albert, 4,959,552, Cl. 250-560.000.

Schilling, Bernd; Brink, Gerhard; Harder, Ingo; and Wiest, Hubert. Self-crosslinking vinyl ester dispersions having a reduced formaldehyde content or containing no formaldehyde for strengthening textile fiber structures. 4,959,249, Cl. 427-387.000.

Schleifstein, Robert A., to Ethyl Corporation. Polybrominated bis sulfonamides. 4,959,500, Cl. 564-82.000.

Schlitt, Steven C., to GTE Products Corporation. Cosmetic tanning lamp and system having adjustable UVB proportion. 4,959,551, Cl. 250-504.00R.

Schlobohm, Michael: *See*—
Bartmann, Martin; Feinauer, Roland; Hartkopf, Uwe; and Schlobohm, Michael, 4,959,403, Cl. 524-169.000.

Schlumberger Industries, S.A.: *See*—
Janssen, Sylvain; Fouinaud, Claude; and Lagarde, Gerard, 4,958,996, Cl. 418-152.000.

Schmanski, Donald W.; and Leigh, Michael M., to Carsonite International. Horizontal reflective highway marker. 4,958,954, Cl. 404-10.000.

Schmeykal, Rudolf: *See*—
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Schmickl, Helfried: *See*—
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Schmidt, Adolf; Hendricks, Udo W.; Bomer, Bruno; Ott, Karl H.; Eichenauer, Herbert; and Pischtschan, Alfred, to Bayer Aktiengesellschaft. Polymeric emulsifiers based on aminotelechelic oligomers I. 4,959,419, Cl. 525-301.000.

Schmidt, Charles J. Robot cleaner for use between parallel plates. 4,958,398, Cl. 15-93.100.

Schmidt, David A.: *See*—
Meyer, James M.; Schmidt, David A.; and Donner, Peter M., 4,959,582, Cl. 312-307.000.

Schmidt, Douglas C., to AT&T Bell Laboratories. Interconnection medium. 4,959,555, Cl. 307-219.000.

Schmidt, Matthew F.: *See*—
Shier, John S.; and Schmidt, Matthew F., 4,959,697, Cl. 357-22.000.

Schmidt-Ott, Andreas: *See*—
Burtscher, Heinz; Schmidt-Ott, Andreas; and Siegmann, Hans-Christoph, 4,959,010, Cl. 431-12.000.

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Seikosha Co., Ltd.: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
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Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsuhi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, 4,958,956, Cl. 405-23.000.
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Smith, David A.; Geiger, Herbert B.; and Behr, R. Douglas, to Dow Chemical Company, The. Film tension compensation device for bag making machine. 4,959,044, Cl. 493-194.000.
Smith, David W., to British Telecommunications public limited company. Spread spectrum optical communication system with heterodyne detection. 4,959,826, Cl. 370-1.000.
Smith, Paul W.: *See*—
Meade, Alan J.; and Smith, Paul W., 4,958,725, Cl. 198-836.100.
Smith, Randall K.: *See*—
Kiraly, Patrick S.; Metzger, John R.; and Smith, Randall K., 4,959,633, Cl. 338-22.00R.
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Smith, Terry L.; and Krietzman, William D., to Harris Corporation. Telephone wire termination blade storage compartment. 4,958,427, Cl. 27-566.400.
SmithKline Beecham Corporation: *See*—
Lafferty, John J.; Demarinis, Robert M.; and Venslavsky, Joseph W., 4,959,360, Cl. 514-217.000.
Smock, Steven W.: *See*—
Cole, Ronald E.; Amonett, Daniel K.; and Smock, Steven W., 4,959,512, Cl. 200-38.00R.
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Lombardo, Jorge H.; Smolko, Eduardo E.; Ugalde, Rodolfo A.; and Rivenson, Scholein, 4,959,211, Cl. 424-93.000.
Smothers, William K.; Doraiswamy, Krishna C.; Armstrong, Mark L.; and Trout, Torence J., to Du Pont de Nemours, E. I., and Company.

Dry film process for altering wavelength response of holograms. 4,959,283, Cl. 430-1.000.

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SMS Engineering Incorporated: *See*—
Schmiedberg, Winfried F., 4,958,718, Cl. 198-456.000.

Smyth, Jerry S.: *See*—
Woods, Richard E.; Bonner, Guy, Jr.; Smyth, Jerry S.; and Felton, Roger D., 4,959,637, Cl. 340-573.000.

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Annis, Jeffrey R.; Herman, Timm R.; and Strobel, Ronald T., 4,958,541, Cl. 81-479.000.

Snead, Edwin deS. System for the transport of bulk commodities. 4,958,977, Cl. 414-339.000.

Snuttjer, Owen R.; and Rasinski, Michael J., to Westinghouse Electric Corp. Stator coil water system early alert hydrogen leakage monitor. 4,959,569, Cl. 310-53.000.

Snyder, Robert L.: *See*—
Bhargava, Atit; and Snyder, Robert L., 4,959,089, Cl. 65-33.000.

Societa Italiana Vetro - SIV S.p.A.: *See*—
De Leonibus, Vittore; and Pascale, Carmine, 4,959,117, Cl. 156-497.000.

Societe Anonyme dite: Compagnie Generale d'Electricite: *See*—
Fevrier, Herve ; Ramos, Josiane; Auge, Jacques; Marcerou, Jean-Francois; Jacquier, Bernard; and Gacon, Jean-Claude, 4,959,837, Cl. 372-6.000.

Societe Anonyme dite: SAFT: *See*—
Caesta, Rosendo, 4,959,604, Cl. 320-20.000.

Societe Francaise Hoechst: *See*—
Cabestany, Jean, 4,959,061, Cl. 604-368.000.

Soderberg, Paulmer M.: *See*—
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.

Soffer, Bernard H.: *See*—
Owechko, Yuri; and Soffer, Bernard H., 4,958,914, Cl. 350-342.000.

Soileau, Trasimond A., to General Electric Company. Luminaire containment means for lamp rupturing. 4,959,762, Cl. 362-376.000.

Sol Gingi-Pak, A Division of Belport Co., Inc.: *See*—
Reynolds, Fred W., 4,959,013, Cl. 433-35.000.

Solberg, Jeffrey J.: *See*—
Stasz, Peter; Solberg, Jeffrey J.; and Grabinger, Scott R., 4,958,539, Cl. 76-104.100.

Soldavini, Teodoro. Mowing machine. 4,958,482, Cl. 56-14.300.

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Dehennau, Claude, 4,959,269, Cl. 428-421.000.

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Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, 4,959,440, Cl. 528-125.000.

Sony Corporation: *See*—
Fujii, Hiroshi; and Katsuki, Shinji, 4,959,738, Cl. 360-78.130.
Horimai, Hideyoshi; and Aoki, Yoshio, 4,959,820, Cl. 369-13.000.
Ito, Yujiro, 4,958,902, Cl. 350-96.180.
Mandle, Gary, 4,959,725, Cl. 358-222.000.
Nishi, Yoshio; Azuma, Hideto; and Omaru, Atsuo, 4,959,281, Cl. 429-194.000.
Osozuka, Kuniharu; and Yoshino, Takashi, 4,958,836, Cl. 273-184.00R.

Soref, Richard A.: *See*—
Friedman, Lionel; and Soref, Richard A., 4,958,898, Cl. 350-96.140.

Sorensen, Jens O., to Primtec. Self-aligning mold for injection molding of hollow plastic products. 4,959,005, Cl. 425-577.000.

Sotech, Inc.: *See*—
Nelson, Thomas E., 4,958,620, Cl. 126-344.000.

Soto, Javier B.; and Llamas, Domingo F. Semirigid floating pavement. 4,958,964, Cl. 404-40.000.

Soto, Miguel A. P.: *See*—
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.

Sotralentz S.A.: *See*—
Pfeiffer, Pierre; Cheval, Benoit; and Sigwalt, Paul, 4,959,190, Cl. 264-516.000.

Southwire Company: *See*—
Clarkson, James H.; Rhodes, Kenneth R.; Betterton, Bruce E.; and Foster, Richard B., 4,959,102, Cl. 75-649.000.

SpaceLabs, Inc.: *See*—
Logan, Charles H., 4,958,640, Cl. 128-671.000.

Spaeth, Michael M. Fire protection filter. 4,958,554, Cl. 98-1.000.

Spain, Patrick L.: *See*—
Rohrbacher, Frank; Spain, Patrick L.; and Fahlsing, Roger A., 4,959,189, Cl. 264-510.000.

Spalding & Evenflo Co., Inc.: *See*—
Meeker, Paul K., 4,958,887, Cl. 297-250.000.

Spallone, John J.; Doyle, William E.; and Cawley, Peter, to Dexter Systems, Inc. Automated shopping order entry system. 4,959,686, Cl. 364-401.000.

Spamer, William S., to Mead Corporation, The. Composite organizer and gravity feed shelf. 4,958,739, Cl. 211-153.000.

Spangenberg, Robbert E., to Hunter Douglas International N.V. Method for assembling a venetian blind. 4,958,421, Cl. 29-24.500.

Spartanics, Ltd.: *See*—
Willits, Samuel P.; Meiri, Samuel; and Muckerheide, Jon C., 4,958,824, Cl. 271-11.000.

Spaulding, Tedford H.: *See*—
Garay, Antonio A.; Spaulding, Tedford H.; and Valleau, Robert L., 4,959,028, Cl. 439-733.000.

Spector, George: *See*—
Ruiz, Arthur; and Spector, George, 4,959,031, Cl. 439-759.000.

Spectra-Physics, Inc.: *See*—
Everhart, John D., 4,958,717, Cl. 198-416.000.

Speiser, Peter P.; and Joshi, Rajendra K. Pharmaceutical preparation for the treatment of psoriatic arthritis. 4,959,389, Cl. 514-494.000.

Spendel, Wolfgang U., to Procter & Gamble Company, The. Soft tissue paper containing noncationic surfactant. 4,959,125, Cl. 162-158.000.

Spiliadis, Apostol: *See*—
Stancesco, Alexandra; Spiliadis, Apostol; and Dumas, Theodore, 4,959,212, Cl. 424-94.100.

Springs Industries, Inc.: *See*—
Montgomery, Terry G.; and Martin, William G., 4,958,485, Cl. 57-210.000.

Stahlecker, Fritz, to Stahlecker, Hans, a part interest. Process and an arrangement for piecing an air-spun yarn. 4,958,486, Cl. 57-261.000.

Stahlecker, Hans: *See*—
Stahlecker, Fritz, 4,958,486, Cl. 57-261.000.

Stancesco, Alexandra; Spiliadis, Apostol; and Dumas, Theodore. Oxidizing-energizing composition and method for the treatment of diabetes. 4,959,212, Cl. 424-94.100.

Stand, Mille: *See*—
Eilender, Kasriel; and Stand, Mille, 4,959,059, Cl. 604-358.000.

Standard Oil Company, The: *See*—
Nichols, Randall W., 4,959,152, Cl. 210-651.000.

Stanek, Tom G., to W. R. Grace & Co.-Conn. Method and apparatus for coating a food product. 4,958,412, Cl. 17-41.000.

Stanislas, Ehrlich; Laurent, Janniere; Evelyne, Pierre; and Niaudet, Brigitte, to Centre National de la Recherche Scientifique (CNRS). Process for amplifying the expression of a specific gene in bacillus subtilis, and strains obtained. 4,959,316, Cl. 435-172.300.

Stanley, James P.: *See*—
Fan, You-Ling; Brode, George L.; and Stanley, James P., 4,959,432, Cl. 526-287.000.

Stanley, Thomas R., to Teepak, Inc. Dual tube stuffing horn with expanding spring for size control. 4,958,411, Cl. 17-41.000.

Stardent Computer, Inc.: *See*—
Rubinstein, Jon; and Klingman, Kenneth C., 4,959,781, Cl. 364-200.000.

Starr, Ruth L.: *See*—
Blandino, Thomas; and Starr, Ruth L., 4,958,636, Cl. 128-630.000.

Staschewski, Harry: *See*—
Bruenn, Rainer; Heisterhagen, Rolf; Klebl, Wolfram; and Staschewski, Harry, 4,958,780, Cl. 242-47.000.

Stasz, Peter; Solberg, Jeffrey J.; and Grabinger, Scott R., to Everest Medical Corporation. Method of making an electrosurgical spatula blade. 4,958,539, Cl. 76-104.100.

Stater, Vernon L. Apparatus for adjusting the resting heights of free-moving barbells on weight-training racks or stands. 4,958,833, Cl. 272-123.000.

Stautzenberger, Adin L.; Quick, Edward E.; and Lobo, Peter F., to Hoechst Celanese Corporation. Process for preparing low color polyarylates. 4,959,449, Cl. 528-271.000.

Steele, Randy C., to SGS-Thomson Microelectronics, Inc. Sense amplifier power down circuitry for programmable logic device. 4,959,564, Cl. 307-465.000.

Steffan, Bert: *See*—
Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.

Steglich, Wolfgang: *See*—
Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.

Steininger, Helmut; and , to BASF Aktiengesellschaft. Production of a sheet-like, multilayer magneto-optical recording material. 4,959,243, Cl. 427-48.000.

Steinke, Leo: *See*—
Bruggen, Gerhard; Keiper, Winfried; and Steinke, Leo, 4,958,515, Cl. 73-116.000.

Stellar, Albert: *See*—
Butler, Thomas L.; and Stellar, Albert, 4,958,396, Cl. 15-21.200.

Stenger, Claudia V.: *See*—
Huang, Shu-Jen W.; and Stenger, Claudia V., 4,959,147, Cl. 210-712.000.

Stephens, Charles M.: *See*—
MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., 4,959,596, Cl. 318-254.000.

Stephens, William F. N., to Renishaw Plc. Opto-electronic scale-reading apparatus. 4,959,542, Cl. 250-237.00G.

Stephenson, Dwight B.: *See*—
Schutten, Herman P.; Stephenson, Dwight B.; and Haarstad, Donald M., 4,958,493, Cl. 60-384.000.

Sterling Bouquet: *See*—
Aldrich, Jay L., 4,958,461, Cl. 47-41.010.

Sterling Drug Inc.: *See*—
Wentland, Mark P., 4,959,363, Cl. 514-235.200.

Sterling, Duane M. Kite, 4,958,787, Cl. 244-153.00R.

Sternling, Charles V., to Shell Oil Company. Process for gasification of coal utilizing reactor protected interally with slag coalescing materials. 4,959,080, Cl. 48-210.000.

Stettiner, Yoram; Adlersberg, Shabtai; and Aizner, Mendel, to DSP Group, Inc., The. A method for indicating the presence of speech in an audio signal. 4,959,865, Cl. 381-46.000.
Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., to General Motors Corporation. Fuel injection. 4,958,773, Cl. 239-584.000.
Stevens, Christopher E.: *See*—
Nguyen, Tanh V.; Davenport, C. Brent; Stevens, Christopher E.; Reis, John C.; and Millhone, Ralph S., 4,958,684, Cl. 166-252.000.
Stevens, Wesley D.: *See*—
Dube, Ghyslain; Huni, Jean-Paul; Lavoie, Serge; and Stevens, Wesley D., 4,959,100, Cl. 75-10.190.
Stiles, Steven D.; Reinke, Paul E.; and Gomez, Aparicio J., to General Motors Corporation. Method and means for determining air mass in a crankcase scavenged two-stroke engine. 4,958,516, Cl. 73-118.200.
Stirling, Robert; and Coombes, Steven A., to Electricity Association Services Limited; and APV U.K. Limited, part interest to each. Apparatus for heating an electrically conductive flowable material flowing through a pipeline. 4,959,525, Cl. 219-291.000.
Stoffel, Florence: *See*—
Bendel, Lee; and Stoffel, Florence, 4,959,068, Cl. 606-222.000.
Stokes, Brian P., to General Scanning, Inc. Dynamically tunable resonant device with electric control. 4,959,568, Cl. 310-51.000.
Stoltman, Donald D.: *See*—
Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., 4,958,773, Cl. 239-584.000.
Stone, R. Douglas; and Turner, Thomas W., to Welch Allyn, Inc. Interchangeable laryngeal blade. 4,958,624, Cl. 128-11.000.
Stork PMT B.V.: *See*—
van den Nieuwelaar, Adrianus J.; and Janssen, Petrus C. H., 4,958,694, Cl. 177-145.000.
Strand, Bengt N. G.; and Eklund, Sven L., to Seco Tools AB. Tool for metal cutting. 4,958,965, Cl. 408-226.000.
Strasser, Wilhelm: *See*—
Haefner, Hans-Ulrich; Klotz, Manfred; and Strasser, Wilhelm, 4,958,499, Cl. 62-55.500.
Strobel, Ronald T.: *See*—
Annis, Jeffrey R.; Herman, Timm R.; and Strobel, Ronald T., 4,958,541, Cl. 81-479.000.
Strohm, Karl: *See*—
Behr, Wolfgang; Luy, Johann-Friedrich; and Strohm, Karl, 4,959,328, Cl. 437-86.000.
Strubbe, Hugo J.; and Gentner, Donald R., to North American Philips Corporation. Picture-in-picture television receiver control. 4,959,719, Cl. 358-183.000.
Stufler, Siegfried; Hetzendorf, Georg; Fransen, Benedictus C. H.; Rijnbeek, Antonius G.; and Schmickl, Helfried, to U.S. Philips Corporation. Electrolytic capacitor. 4,959,754, Cl. 361-527.000.
Stupakis, John S., to JSS Scientific Corporation. Folding anchor. 4,958,586, Cl. 114-297.000.
Stupera, Neal G.: *See*—
Clauw, Mitchell J.; Stupera, Neal G.; Tobin, Theodore W.; and Viscome, Dennis M., 4,958,799, Cl. 248-430.000.
Sturm, Paul A.: *See*—
Nielson, Jay P.; and Sturm, Paul A., 4,958,460, Cl. 47-1.400.
Sturzenbecher, Bruno: *See*—
Siebrand, Gerhard; and Sturzenbecher, Bruno, 4,958,566, Cl. 102-400.000.
Stutz, Gerhard: *See*—
Martin, Hans; and Stutz, Gerhard, 4,958,710, Cl. 192-58.00B.
Submarine and Surface Blaster Pty. Limited: *See*—
Waldock, Kevin H., 4,959,108, Cl. 149-2.000.
Suckling, Colin J.: *See*—
Wood, Hamish C. S.; Suckling, Colin J.; and Rees, Lilias G., 4,959,472, Cl. 544-258.000.
Suda, Yasuo; Arakawa, Kazuhiko; Ohtaka, Keiji; Koyama, Takeshi; and Ohnuki, Ichiro, to Canon Kabushiki Kaisha. Device for detecting the focus adjusted state of an objecting lens. 4,959,677, Cl. 354-402.000.
Suda, Yoshihisa, to Mitsubishi Pencil Co., Ltd. Process for producing acoustic carbon diaphragm. 4,959,185, Cl. 264-81.000.
Suddeutsche Kuhlerfabrik: *See*—
Martin, Hans; and Stutz, Gerhard, 4,958,710, Cl. 192-58.00B.
Suddeutsche Kuhlerfabrik Julius Fr. Behr GmbH & Co. KG: *See*—
Humpolik, Bohumil, 4,958,428, Cl. 29-890.000.
Suder, William H., III: *See*—
Rose, James D.; and Suder, William H., III, 4,958,970, Cl. 411-12.000.
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, to Murata Kikai Kabushiki Kaisha. Apparatus for producing spun yarn. 4,958,487, Cl. 57-328.000.
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, to Taiho Kogyo Co. Ltd. Wet clutch device. 4,958,712, Cl. 192-70.120.
Sugimura, Nobuyuki. Internal-pressure-bearing female screw. 4,958,973, Cl. 411-423.000.
Sugita, Masahiko. Line cleaning apparatus. 4,958,400, Cl. 15-79.100.
Sugiyama, Nobuaki: *See*—
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Toura, Kosuke, 4,959,796, Cl. 364-497.000.
Suguro, Kyoichi, to Kabushiki Kaisha Toshiba. Capacitor and method for producing the same. 4,959,745, Cl. 361-311.000.
Sukenobu, Satoru, to Kabushiki Kaisha Toshiba. Energy analyzer. 4,959,544, Cl. 250-305.000.
Sullivan, Thomas P. Harness iniegrity tester (hit). 4,959,792, Cl. 364-579.000.
Sulzer Brothers Limited: *See*—
Morscher, Erwin W.; and Frey, Otto, 4,959,072, Cl. 623-22.000.
Ziegler, Georg, 4,959,078, Cl. 48-128.000.
Sumitomo Electric Industries, Ltd.: *See*—
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
Satoh, Shuichi; and Tauji, Kazuwo, 4,959,201, Cl. 423-446.000.
Tanaka, Satoshi, 4,958,778, Cl. 242-25.00A.
Ueno, Keiji; and Uda, Ikujiro, 4,959,266, Cl. 428-383.000.
Sumitomo Heavy Industries Ltd.: *See*—
Okuyama, Kazuhiko, 4,959,007, Cl. 425-577.000.
Sumitomo Metal Industries, Ltd.: *See*—
Kusaba, Yoshiaki; Matoba, Hiroyuki; and Yamada, Tsuneo, 4,958,509, Cl. 72-225.000.
Sumitomo Precision Products Co., Ltd.: *See*—
Ogawa, Koji; and Machida, Hikoichi, 4,958,786, Cl. 244-17.130.
Sumitomo Rubber Industries, Ltd.: *See*—
Yamada, Seiki; and Kawamura, Takashi, 4,959,553, Cl. 250-560.000.
Sumitomo Special Metals Co., Ltd.: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
Sumitomo Wiring System, Ltd.: *See*—
Takeuchi, Hideharu; and Sakata, Tsutomu, 4,959,509, Cl. 174-153.00G.
Sumiya, Mitsuo: *See*—
Ueda, Katsunobu; and Sumiya, Mitsuo, 4,958,815, Cl. 269-58.000.
Sun, Deyu: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.
Sun-Diamond Growers of California: *See*—
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Sun Refining & Marketing Company: *See*—
Berg, Robin; Mohns, Lawrence; and Oswald, Richard, 4,958,957, Cl. 405-55.000.
Sun, Yun C., to Dow Chemical Company, The. Multilayer sheet. 4,959,271, Cl. 428-476.300.
Sun, Yun C., to Dow Chemical Company, The. Polymeric blend composition. 4,959,416, Cl. 525-222.000.
Sunda, Fumihiro: *See*—
Yamamoto, Takemi; Komiya, Ryohei; Hatta, Naoyuki; Matsumoto, Yumio; and Sunda, Fumihiro, 4,959,682, Cl. 355-27.000.
Sundstrand Corporation: *See*—
Pinchott, Gordon A., 4,959,707, Cl. 357-76.000.
Vaidya, Jayant; and Belanger, David J., 4,959,605, Cl. 322-10.000.
Suntec Industries Incorporated: *See*—
Harwath, Frank L., 4,958,997, Cl. 418-171.000.
Suntory Limited: *See*—
Ohfume, Yasufumi; Shimamoto, Keiko; and Shinozaki, Haruhiko, 4,959,493, Cl. 562-506.000.
Sure-Cast Pattern Works, Inc.: *See*—
Nowakowski, Stanley M., 4,959,004, Cl. 425-397.000.
Suris, Vladimir, to Ardac, Inc. (Dixie-Narco, Inc.). Transport system for currency validator. 4,958,715, Cl. 194-206.000.
Susan, Victor R.: *See*—
Sanchez, Florentina S.; Susan, Victor R.; Soto, Miguel A. P.; and Ortega, Agustin P. A., 4,959,327, Cl. 435-172.300.
Sutherland, Fred R.: *See*—
Colquitt, Leroy, Jr.; Sutherland, Fred R.; and Boling, Edward J., 4,959,701, Cl. 357-24.000.
Suto, Akihiko: *See*—
Iwaki, Hiroshi; Mita, Yoshiharu; Miyazaki, Jiro; Suto, Akihiko; Hirose, Satoshi; and Renbutsu, Tadashi, 4,958,823, Cl. 271-9.000.
Suyama, Tadakazu: *See*—
Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.
Suzuki, Go, to NGK Insulators, Ltd. Ceramic substrates and method of manufacturing the same. 4,959,255, Cl. 428-143.000.
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, to Alps Electric Co., Ltd. Precision Gap Magnetic Encode Device. 4,959,574, Cl. 310-91.000.
Suzuki, Hironori: *See*—
Higashibata, Kouji; and Suzuki, Hironori, 4,959,348, Cl. 505-1.000.
Suzuki, Hiroshi: *See*—
Urai, Muneharu; and Suzuki, Hiroshi, 4,958,394, Cl. 5-475.000.
Suzuki, Hiroyuki, to NEC Corporation. Microcomputer having function of generating data signals used for displaying characters. 4,959,793, Cl. 364-900.000.
Suzuki Jidosha Kogyo Kabushiki: *See*—
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroaki, 4,958,538, Cl. 74-866.000.
Suzuki, Katsuhi: *See*—
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Suzuki, Keijiro: *See*—
Shimauchi, Hidenori; and Suzuki, Keijiro, 4,959,278, Cl. 428-642.000.
Suzuki, Kiyoko: *See*—
Dempo, Fumio, 4,959,142, Cl. 210-167.000.

Suzuki, Masato: *See*—
Yoneda, Kenzi; Kajiyama, Toshiki; Sakata, Kazuhiro; Munakata, Mitsuo; and Suzuki, Masato, 4,958,707, Cl. 187-101.000.
Suzuki, Motokazu: *See*—
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Suzuki, Motoyuki: *See*—
Miura, Yoshio; Suzuki, Motoyuki; Fukushima, Akio; and Mori, Yonemitu, 4,959,733, Cl. 358-338.000.
Suzuki, Seiichi: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Suzuki, Takanori: *See*—
Takada, Kazuyoshi; Takayama, Tadashi; Suzuki, Takanori; and Nakanosono, Haruhiko, 4,958,534, Cl. 74-475.000.
Suzuki, Tatsuhiro: *See*—
Saruta, Makoto; and Suzuki, Tatsuhiro, 4,959,874, Cl. 455-601.000.
Suzuki, Tetsuo; Takemura, Makoto; and Yoshimura, Shigeru, to Canon Kabushiki Kaisha. Ink jet image formation apparatus with means for collecting ink mist. 4,959,660, Cl. 346-1.100.
Suzuki, Tetsuo: *See*—
Yoshimura, Shigeru; Suzuki, Tetsuo; and Takemura, Makoto, 4,959,666, Cl. 346-136.000.
Suzuki, Tomio: *See*—
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokori, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.
Suzuki, Yoshinori, to Kabushiki Kaisha Toshiba. Magnetic resonance apparatus. 4,959,610, Cl. 324-309.000.
Svensson, Ingemar. Arrangement for a lift adapted to a motor vehicle. 4,958,979, Cl. 414-549.000.
Swagerty, Billy H., to O'Bryant, Carl E.; and O'Bryant, Linda K. Modular tack room. 4,958,594, Cl. 119-7.000.
Swain, Eugene A.; Menzin, Marvin; Agranat, Edward A.; Cofek, Henry R.; and Fisher, Daniel J., to Xerox Corporation. Apparatus and process for preparing belts. 4,959,109, Cl. 156-73.400.
Swanson, Craig A., to Schneider Metal Manufacturing Co. Ice cooled beverage dispenser and method of making same. 4,958,505, Cl. 62-398.000.
Swart, Nicolaas C., to Heuft-Qualiplus B.V. Inspection device. 4,959,538, Cl. 250-223.00B.
Swartzendruber, James A., to Deere & Company. Transmission control structure including a combination direction and cruise control and a brake interlock. 4,958,535, Cl. 74-481.000.
Sweeny, Wilfred, to Du Pont de Nemours, E. I., and Company. Process for the preparation of a poly(paraphenylene terephthalamide)fibrous gel composition and a process to produce poly(paraphenylene terephthalamide) paper from the composition. 4,959,453, Cl. 528-336.000.
Switchcraft Inc.: *See*—
Garay, Antonio A.; Spaulding, Tedford H.; and Valleau, Robert L., 4,959,028, Cl. 439-733.000.
Syntex (U.S.A.) Inc.: *See*—
Milburn, Gary L.; Rabbie, Judith; and Houts, Thomas M., 4,959,303, Cl. 435-7.000.
Nelson, Peter H.; Allison, Anthony C.; Eugui, Elsie M.; and Muchowski, Joseph M., 4,959,387, Cl. 524-469.000.
Olson, John D., 4,959,307, Cl. 435-7.000.
Sanders, Lynda M.; and Domb, Abraham, 4,959,217, Cl. 424-473.000.
Szczepanek, Andre, to Texas Instruments Incorporated. Content addressable memory including comparison inhibit and shift register circuits. 4,959,811, Cl. 365-49.000.
Szczesny, Paul M.: *See*—
MacMinn, Stephen R.; Stephens, Charles M.; and Szczesny, Paul M., 4,959,596, Cl. 318-254.000.
TA Triumph-Adler Aktiengesellschraft: *See*—
Haftmann, Johannes; and Schmeykal, Rudolf, 4,958,949, Cl. 400-314.000.
Tabb, Charles H., to Xerox Corporation. Two-pass highlight color imaging with developer housing bias switching. 4,959,286, Cl. 430-45.000.
Tachi-S Co., Ltd.: *See*—
Urai, Muneharu; and Suzuki, Hiroshi, 4,958,394, Cl. 5-475.000.
Tachihara, Hisaaki: *See*—
Kimura, Tadashi; Ikeda, Tanejiro; Tachihara, Hisaaki; and Oshima, Kunio, 4,959,748, Cl. 361-323.000.
Tachikawa, Michiyoshi, to Ricoh Company, Ltd. Character recognition apparatus having means for compressing feature data. 4,959,870, Cl. 382-56.000.
Tada, Hisashi; Agata, Akira; Saruta, Masahiro; and Murata, Takashi, to Mitsubishi Rayon Company, Ltd. Epoxy resin composition and prepreg for composite materials using the same from bi and tri-epoxides, triarylbisphenols and diaminodiphenylsulfones. 4,959,438, Cl. 528-98.000.
Taguchi, Akihiro: *See*—
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
Taguchi, Yasuhiro; and Yoshida, Hiroichi, to Sharp Kabushiki Kaisha. Display unit having an improved editing input capability. 4,959,643, Cl. 340-721.000.
Tahara, Kazuo: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.
Tai, Hwai T.; and Ng, Yee S., to Eastman Kodak Company. False density contour suppression using randomly modified input signals for comparison to threshold values. 4,959,730, Cl. 358-298.000.
Taiho Kogyo Co. Ltd.: *See*—
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.
Takabayashi, Naoki: *See*—
Kurematsu, Masayuki; Koboshi, Shigeharu; Goto, Nobutaka; and Takabayashi, Naoki, 4,959,122, Cl. 159-42.000.
Takada, Kazuyoshi; Takayama, Tadashi; Suzuki, Takanori; and Nakanosono, Haruhiko, to Yamaha Hatsudoki Kabushiki Kaisha. Shift device for hydraulic transmission. 4,958,534, Cl. 74-475.000.
Takagi, Hiroshi: *See*—
Mori, Yoshiaki; Takagi, Hiroshi; Fujino, Masaru; and Sakabe, Yukio, 4,959,333, Cl. 501-136.000.
Takagi, Osamu: *See*—
Matsumoto, Yumio; Kimura, Yasuo; Takagi, Osamu; and Takemoto, Takatoshi, 4,959,529, Cl. 219-388.000.
Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, 4,958,781, Cl. 242-71.700.
Takahashi, Hiroji: *See*—
Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, 4,959,030, Cl. 439-67.000.
Takahashi, Hiroshi: *See*—
Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, 4,959,296, Cl. 430-302.000.
Takahashi, Kenji: *See*—
Arakawa, Satoshi; and Takahashi, Kenji, 4,959,545, Cl. 250-327.200.
Takahashi, Koji; Kozuki, Susumi; Mogi, Hirokazu; Kawahara, Hideo; Arai, Hideyuki; Suzuki, Katsushi; Mabuchi, Toshiaki; and Kobayashi, Takashi, to Canon Kabushiki Kaisha. Interchangeable lens and interchangeable lens system. 4,959,728, Cl. 358-228.000.
Takahashi, Noriyoshi: *See*—
Saitoh, Toshio; Takahashi, Noriyoshi; and Satoh, Masaki, 4,959,575, Cl. 310-213.000.
Takahashi, Tohru: *See*—
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.
Takahashi, Toshihisa: *See*—
Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moromaga, Takahiro; and Nishida, Shinichi, 4,958,611, Cl. 123-479.000.
Takahashi, Tsunehide: *See*—
Katoh, Eiichi; Hoshi, Hitoshi; Takahashi, Tsunehide; and Asakura, Koichi, 4,959,687, Cl. 355-214.000.
Takai, Akira: *See*—
Hitomi, Mitsuo; Sasaki, Junso; Takai, Akira; Umezono, Kazuaki; and Hinatsae, Fumio, 4,958,606, Cl. 123-316.000.
Takami, Akio; Matsuura, Toshitaka; and Furusaki, Keizo, to NGK Spark Plug Co., Ltd. Gas sensing element. 4,958,514, Cl. 73-25.030.
Takami, Atsushi: *See*—
Ishida, Hiroaki; Nemoto, Ichiro; Sato, Koji; Takami, Atsushi; Nakano, Yoichi; Ishii, Isamu; and Iwamatsu, Yoshiyuki, 4,959,680, Cl. 354-435.000.
Takanashi, Itsuo; Nakagaki, Shintaro; Shinonaga, Hirohiko; Asakura, Tsutou; and Furuya, Masato, to Victor Company of Japan, Ltd. Image pickup device using a photo-to-photo conversion element. 4,959,722, Cl. 358-211.000.
Takashima, Kazuki: *See*—
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.
Takatsudo, Suguru: *See*—
Kamuro, Yasuo; Kakiuchi, Toshihito; and Takatsudo, Suguru, 4,959,093, Cl. 71-88.000.
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Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.
Takayama, Tadashi: *See*—
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Takeda Chemical Industries, Inc.: *See*—
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Takeda Chemical Industries, Ltd.: *See*—
Matsumura, Koichi; Kimura, Hiroshi; Mise, Noritoshi; and Miki, Hiroshi, 4,959,483, Cl. 549-315.000.
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Takeda, Mizuho: *See*—
Nakajima, Shigeharu; Shinomiya, Genichi; Takeda, Mizuho; and Chikutei, Satoru, 4,959,174, Cl. 252-301.60R.
Takeda, Yoshinobu: *See*—
Hagiwara, Yoshitoshi; Koya, Eitaro; Hayashi, Tetsuya; and Takeda, Yoshinobu, 4,959,276, Cl. 428-614.000.
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
Takegawa, Yoshikazu: *See*—
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.

Takegawa, Yujiro, to Tsudakoma Corporation. Pick extracting device with rotative drive. 4,958,662, Cl. 139-116.200.

Takehana, Sakae: *See*—
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.

Takemoto, Takatoshi: *See*—
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Takemura, Makoto: *See*—
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Takenaka, Akira: *See*—
Suganuma, Tatsumi; Nozue, Shigehiro; Fukuoka, Tatsuhiko; Noguchi, Naoto; and Takenaka, Akira, 4,958,712, Cl. 192-70.120.

Takeshita, Akihiko: *See*—
Suganuma, Buro; Nishimura, Shinichi; and Takeshita, Akihiko, 4,958,487, Cl. 57-328.000.

Takeshita, Takuo: *See*—
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tosda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.

Taketo, Makoto, to Jackson Laboratory, The. Cellular enhancer for expressing genes in undifferentiated stem cells. 4,959,313, Cl. 435-69.100.

Takeuchi, Hideharu; and Sakata, Tsutomu, to Sumitomo Wiring System, Ltd. Grommet assembly for main and auxiliary wire harnesses. 4,959,509, Cl. 174-153.0GG.

Taki, Tsuneo: *See*—
Morimoto, Kazuhiro; and Taki, Tsuneo, 4,958,521, Cl. 73-827.000.

Takimoto, Akiyoshi: *See*—
Yoshida, Yukio; Takimoto, Akiyoshi; and Mursi, Shigenobu, 4,959,598, Cl. 318-599.000.

Takizawa, Hitoshi: *See*—
Kochi, Mashanori; Morikawa, Juichi; Ibe, Makoto; Ozaki, Shinji; and Takizawa, Hitoshi, 4,959,743, Cl. 360-130.240.

Tama Biochemical Co., Ltd.: *See*—
Hayashi, Sei-ichi; Hohjoh, Tadashi; Shida, Atsuhiko; and Ikekawa, Nobuo, 4,959,097, Cl. 71-112.000.

Tamada, Kazukiyo: *See*—
Miida, Takashi; Murayama, Jin; Tamada, Kazukiyo; and Kagechika, Takashi, 4,959,726, Cl. 358-227.000.

Tamai, Shoji; Kawashima, Saburo; Sonobe, Yoshiho; Ohta, Masahiro; Oikawa, Hideaki; and Yamaguchi, Akihiro, to Mitsui Toatsu Chemicals, Inc. Polymide for high-temperature adhesive. 4,959,440, Cl. 528-125.000.

Tamai, Yoshin: *See*—
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, 4,959,393, Cl. 514-724.000.

Tamari, Takanori: *See*—
Iguchi, Takaaki; Tamari, Takanori; Hira, Takaaki; Isobe, Kunio; Yarita, Ikuo; and Abe, Hideo, 4,959,275, Cl. 428-603.000.

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Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.

Tanaka, Hideki; and Umemura, Kyoichi, to Mazda Motor Corporation. Layout of auxiliary mechanisms for an engine. 4,959,042, Cl. 474-134.000.

Tanaka, Katsuji: *See*—
Hirahara, Takuji; Nukui, Masahiro; and Tanaka, Katsuji, 4,959,421, Cl. 525-437.000.

Tanaka, Masahiro; Ohyama, Takumi; Hirayama, Akihiko; Kiyokawa, Tetsushi; Ichii, Seiji; Katsura, Yutaka; Ono, Tadashi; and Shimizu, Katsunori, to Shimizu Construction Co., Ltd. Submerged flexible wave restraining structure and a method of constructing it. 4,958,956, Cl. 405-23.000.

Tanaka, Minoru: *See*—
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokozi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.

Tanaka, Satoshi, to Sumitomo Electric Industries, Ltd. Device for continuously winding a wire-like element. 4,958,778, Cl. 242-25.00A.

Ta aka, Tadashi; Matsumura, Kazuo; Komorita, Hiroshi; and Mizunoya, Nobuyuki, to Kabushiki Kaisha Toshiba. Bonded ceramic metal composite substrate, circuit board constructed therewith and methods for production thereof. 4,959,507, Cl. 174-260.000.

Tanaka, Yasuzo; Matsumoto, Kaname; and Yamada, Yukio, to Furukawa Electric Co., Ltd., The. Superconducting wire containing multifilamentary superconducting alloy. 4,959,279, Cl. 428-660.000.

Tanaka, Yoshihiro: *See*—
Matsuda, Motonobu; Tanaka, Yoshihiro; Nakanishi, Motohiro; Taniguchi, Nobuyuki; and Ootsuka, Hiroshi, 4,959,676, Cl. 354-400.000.

Tango, Chobe: *See*—
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Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.

Taniguchi, Osamu: *See*—
Okada, Shinjiro; Takahashi, Tohru; Kawagishi, Hideyuki; Inaba, Yutaka; and Taniguchi, Osamu, 4,958,915, Cl. 350-345.000.

Taniguchi, Tomokuni: *See*—
Uemura, Yashiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.

Tanino, Katsumi; and Nakada, Morihito, to Toyokako Kabushiki Kaisha. Method of making piezoelectric polymer using polytetramethylene oxide di-p-aminobenzoate. 4,959,439, Cl. 528-111.000.

Tanioka, Hiroshi, to Canon Kabushiki Kaisha. Image processing system. 4,959,868, Cl. 382-41.000.

Tanner, Daniel J.: *See*—
Smiles, Kenneth A.; Peets, Edwin A.; and Tanner, Daniel J., 4,959,210, Cl. 424-85.700.

Tanzawa, Kenji: *See*—
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Taomo, Toshio: *See*—
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Tarbet, Byron J.: *See*—
Bradshaw, Jerald S.; Tarbet, Byron J.; Krakowiak, Krzysztof E.; Biernat, Jan F.; Bruening, Ronald L.; and Izatt, Reed M., 4,959,153, Cl. 210-670.000.

Tasaka, Kenji: *See*—
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Tashiro, Koichi; Okamoto, Shinichiro; and Okamoto, Tatsuro, to Namco Ltd. Game playing system. 4,958,835, Cl. 273-85.00G.

Tate, Lloyd, to Zoecon Corporation. Animal identification ear tag assembly. 4,958,452, Cl. 40-301.000.

Tatebe, Yu; Yasui, Hiroshi; Matsuyama, Yukio; and Takahashi, Hiroji, to Japan Aviation Electronics Industry, Limited; and NEC Corporation. Electrical connector for connecting two flat cables to a circuit board. 4,959,030, Cl. 439-67.000.

Tatian, Berge, to Litton Systems, Inc. System utilizing an achromatic null lens for correcting aberrations in a spherical wavefront. 4,958,931, Cl. 356-360.000.

Tatsumi, Takumi: *See*—
Yamashita, Yoshinori; Hirano, Sadayuki; Murano, Katsuaki; Tatsumi, Takumi; and Yamamoto, Hiroshi, 4,958,538, Cl. 74-866.000.

Tatsumi, Yuuichi: *See*—
Iwahashi, Hiroshi; Kato, Hideo; and Tatsumi, Yuuichi, 4,959,816, Cl. 365-233.500.

Tattermusch, Peter, to Daimler-Benz AG. Triangular swinging arm for wheel suspensions of motor vehicles. 4,958,863, Cl. 280-696.000.

Taubitz, Christof; Seiler, Erhard; Hazlbrecht, Juergen; Mitulla, Konrad; and Boehlke, Klaus, to BASF Aktiengesellschaft. Thermoplastic molding materials based on polyphenylene ethers, nylons and styrene copolymers. 4,959,415, Cl. 525-133.000.

Taylor, James R.; Gomes, Anderson S. L.; and Gouveia-Neto, Artur D., to British Telecommunications public limited company. Radiation pulse generation. 4,958,910, Cl. 350-321.000.

Taylor, Marc D.; and Beardsley, Duane, to Artromick International, Inc. Split drawer assembly. 4,958,891, Cl. 312-287.000.

Taylor, Robert S.: *See*—
Stettner, Ernest R.; Stoltman, Donald D.; and Taylor, Robert S., 4,958,773, Cl. 239-584.000.

Taylor, Roland S., to General Motors Corporation. Fuel injection. 4,958,774, Cl. 239-584.000.

Tchilinguirian, George G. Anti auto theft retractable pole. 4,958,699, Cl. 180-287.000.

Technomedica, Inc.: *See*—
Arnett, G. William; Buss, Rick A.; and Bruce, Robert A., 4,959,065, Cl. 606-69.000.

Teepak, Inc.: *See*—
Stanley, Thomas R., 4,958,411, Cl. 17-41.000.

Tegal Corporation: *See*—
Zajac, John P., 4,958,658, Cl. 137-613.000.

Teijin Limited: *See*—
Ohkawa, Kazumi; Matsuki, Toshitsugu; and Saiki, Noritsugu, 4,959,442, Cl. 528-168.000.

Teleco Oilfield Services Inc.: *See*—
Maron, Robert, 4,958,517, Cl. 73-151.000.

Teledyne Industries, Inc.: *See*—
Peace, Steven L.; and Petrovic, John E., 4,958,629, Cl. 128-66.000.

Telefonaktiebolaget L M. Ericsson: *See*—
Petersen, Lars-Goran, 4,959,830, Cl. 370-108.000.

Telektron Limited: *See*—
Dowdall, Dennis S., 4,958,659, Cl. 137-624.120.

Tennesse Valley Authority: *See*—
Trundle, Mark H.; and Jones, William C., 4,959,192, Cl. 376-260.000.

Tenney, Allen. Debris deflector for transported cycle. 4,958,761, Cl. 224-316.000.

Tensor Development, Inc.: *See*—
McIntosh, James L., 4,959,797, Cl. 364-508.000.

Terada, Hirokiyo: *See*—
Kuroda, Shigeaki; Oguni, Kousaku; Senshu, Takao; Terada, Hirokiyo; Nagai, Makoto; and Hanada, Masamichi, 4,958,500, Cl. 62-89.000.

Terada, Katsuaki: *See*—
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Terao, Shinji; and Hirata, Minoru, to Takeda Chemical Industries, Inc. Pharmaceutical compositions containing certain ascorbic acid derivatives useful in the prophylaxis and treatment of disorders of the circulatory system. 4,959,362, Cl. 514-231.500.
Teraoka, Masao: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
Terna, Daniele: *See*—
O'Neal, Glenn B.; Baker, Quentin A.; Mecredy, Henry E., III; and Terna, Daniele, 4,958,605, Cl. 123-300.000.
Terrell, Robert B.: *See*—
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Texas Instruments Incorporated: *See*—
Frensley, William R.; and Reed, Mark A., 4,959,696, Cl. 357-16.000.
Schenck, Stephen R., 4,959,563, Cl. 307-448.000.
Slaughter, John E.; and Terrell, Robert B., 4,959,802, Cl. 364-521.000.
Szczepanek, Andre, 4,959,811, Cl. 365-49.000.
Thayer, Donald O., Jr. Photography booth and method. 4,959,670, Cl. 354-76.000.
Thiele, Klaus: *See*—
Busch, Peter; and Thiele, Klaus, 4,958,647, Cl. 132-119.100.
Thomas, Geoffrey N.: *See*—
Cross, Peter E.; Thomas, Geoffrey N.; and Arrowsmith, John E., 4,959,366, Cl. 514-239.500.
Thomas, Mark S.: *See*—
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.
Thomas, Phillip M.: *See*—
Cobb, Gary S.; and Thomas, Phillip M., 4,958,903, Cl. 350-96.200.
Thomas, Wayne M.; and Nicholas, Edward D., to Welding Institute, The. Surfacing method. 4,959,241, Cl. 427-11.000.
Thompson, Barbara J.; and Ursery, Jesse, Jr., to Tutor Toys, Inc. Electronic learning device for teaching how to handle money. 4,959,017, Cl. 434-110.000.
Thompson, Lyle: *See*—
Apple, William R.; Freeman, William R.; Soderberg, Paulmer M.; Thompson, Lyle; and Thomas, Mark S., 4,959,846, Cl. 375-118.000.
Thompson, Mark S. Gas detector and method for refrigeration systems. 4,958,503, Cl. 62-129.000.
Thompson, Richard A., to Keegan, Robert R., a part interest. Snap-on tie with slider simulating windsor knot. 4,958,383, Cl. 2-150.000.
Thomspon, Mitchell L.; Park, Kyung T.; Ogale, Kumar; and Powers, William B., to Atochem North America, Inc. Device for measuring the speed of a moving object. 4,959,807, Cl. 364-565.000.
Threlkel, Richard S., to Chevron Research Company. Detergent grade olefins, alkylbenzenes and alkylbenzene sulfonates and processes for preparing. 4,959,491, Cl. 562-94.000.
Thue, Baard H.: *See*—
Bjorke, Merlin D.; and Thue, Baard H., 4,959,654, Cl. 342-120.000.
Tighe, Laurence E.; and Parker, Tim, to Dennison Manufacturing Company. Susceptor coating for localized microwave radiation heating. 4,959,516, Cl. 219-10.55F.
Tinkler, Mark: *See*—
Fihey, Jean-Luc; Hazel, Bruce; Di Vincenzo, Antonio; Tinkler, Mark; and McNabb, Scott, 4,959,523, Cl. 219-124.340.
Tipple, Jerome E.; and Tipple, Margie K. Multi-looped cane retaining strap. 4,958,758, Cl. 224-267.000.
Tipple, Margie K.: *See*—
Tipple, Jerome E.; and Tipple, Margie K., 4,958,758, Cl. 224-267.000.
Titus, George R.: *See*—
Williams, Joel L.; and Titus, George R., 4,959,402, Cl. 524-99.000.
Toa Nenryo Kogyo, K.K.: *See*—
Furuhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, 4,959,427, Cl. 526-142.000.
Toa Nenryo Kogyo Kabushiki Kaisha: *See*—
Miura, Tadashi; Itoh, Takuji; Kadono, Masaaki; and Shimada, Masakichi, 4,959,338, Cl. 502-263.000.
Toal, Hugh F.; Careyoie, Nicholas J.; and Sapienza, Michael A., to Congoleum Corporation. Trowel assembly. 4,958,399, Cl. 15-104.00S.
Tobin, Theodore W.: *See*—
Clauw, Mitchell J.; Stupera, Neal G.; Tobin, Theodore W.; and Viscome, Dennis M., 4,958,799, Cl. 248-430.000.
Tobolski, Francis P., Jr.; and D'Avello, Robert F., to Motorola, Inc. Dialing features for cellular telephone with standard telephone set. 4,959,851, Cl. 379-59.000.
Tochigifujisangyo Kabushiki Kaisha: *See*—
Minamitani, Hiromu; Yano, Norio; Ikezawa, Atsushi; Kanayama, Toshio; Ushijima, Takashi; Teraoka, Masao; and Ishikawa, Osamu, 4,959,166, Cl. 252-327.00E.
Toda Kogyo Corp.: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
Todoroki, Toshiya, to NEC Corporation. Serial input-output circuit for forward and backward producing bits from bidirectional shift registers. 4,959,813, Cl. 365-189.120.
Toho Kagaku Kogyo Co., Ltd.: *See*—
Hihara, Takeshi; Yanagiya, Masahide; and Ono, Kazuhito, 4,958,685, Cl. 166-291.000.
Toho, Masato: *See*—
Tsuzuki, Toshiyuki; and Toho, Masato, 4,959,712, Cl. 358-80.000.
Toi, Nao: *See*—
Ohsuma, Hiroaki; Fujikura, Yoshiaki; Fujita, Manabu; and Toi, Nao, 4,959,349, Cl. 512-14.000.
Tokuhara, Kouki: *See*—
Hamamura, Atsushi; Hamada, Takaki; Tokuhara, Kouki; Miyao, Yukimitsu; Imai, Tomoyuki; and Horiishi, Nanao, 4,959,273, Cl. 428-548.000.
Tokunaga, Ichiro: *See*—
Suzuki, Hidemasa; Tokunaga, Ichiro; Abe, Hiraku; and Ogawa, Yasuaki, 4,959,574, Cl. 310-91.000.
Toi, Simon J. M.; and Wouda, Kornelis J., to AT&T Bell Laboratories. Receiver of a system for transmitting data symbols at a given baudrate. 4,959,845, Cl. 375-106.000.
Tomcanin, Deborah T.: *See*—
Glass, Richard A.; Ryer, Robert F., II; and Tomcanin, Deborah T., 4,959,051, Cl. 604-77.000.
Tominaga, Shinji: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.
Tomino, Ikuo: *See*—
Awaya, Akira; Nakano, Takuo; Kobayashi, Hisashi; Tan, Ken E.; Horikomi, Kazutoshi; Sasaki, Tadayuki; Yokoyama, Keiichi; Ohno, Hiroyasu; Kato, Kozi; Kitahara, Takumi; Tomino, Ikuo; and Isayama, Shigeru, 4,959,368, Cl. 514-252.000.
Tomoyasu, Haruo; Tango, Chobe; Omote, Takuo; and Kato, Yoshinori, to Nihon Tokushu Orimono Co., Ltd.; and Kanebo Ltd. Mesh fabric for printing screen. 4,959,260, Cl. 428-255.000.
Tonda, Hideki: *See*—
Hagino, Sadaaki; Suzuki, Motokazu; Takeshita, Takuo; Tonda, Hideki; and Takashima, Kazuki, 4,959,344, Cl. 505-1.000.
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, to LuoYang Petrochemical Engineering Corporation SINOPEC (LPEC); and Institut Francais du Petrole. Process for decoking a delayed coker. 4,959,126, Cl. 201-2.000.
Topel, Howard C.; and Foster, Thomas L., to Vance Products Incorporated. Endoscopic aspiration instrument. 4,958,621, Cl. 128-4.000.
Toray Industries, Inc.: *See*—
Oka, Koichiro; and Hagiwara, Ikuo, 4,959,398, Cl. 523-400.000.
Torihara, Masahiro; Tamai, Yoshin; Shiono, Manzo; and Tasaka, Kenji, to Kuraray Company, Ltd. Skin depigmental agent. 4,959,393, Cl. 514-724.000.
Torii, Naoya: *See*—
Azuma, Mitsuhiro; Amano, Fumio; Akiyama, Ryota; and Torii, Naoya, 4,959,863, Cl. 380-38.000.
Toro Company, The: *See*—
Heismann, Richard A., 4,958,483, Cl. 56-17.500.
Toshiba Kikai Kabushiki Kaisha: *See*—
Adachi, Sakashi, 4,958,967, Cl. 409-185.000.
Tosoh Corporation: *See*—
Nakagawa, Tatsushi; Ishida, Yoshiaki; Kanesaka, Junichiro; and Kaneshige, Yosuke, 4,959,414, Cl. 525-11.000.
Total Spectrum Manufacturing Inc.: *See*—
Gordon, Gary B.; and Gosnelli, Robert R., 4,959,798, Cl. 364-513.000.
Toth, Laszlo P.; Kisa, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, to Budapesti Muszaki Egytem; Mogurt Gepjarmu Kulkereskedelmi Vallalat; and Ikarus Karosszeria es Jarmugyar. Appliance for heating motor vehicles, mainly buses driven with internal combustion engine. 4,958,766, Cl. 237-12.30B.
Totten, David. Collapsible spool holder for fishing line. 4,958,784, Cl. 242-129.600.
Tough, William H., to Scott & Fyfe Limited. Backing material for carpet underlay. 4,959,253, Cl. 428-102.000.
Toura, Kosuke: *See*—
Hidaka, Seiji; Ishihara, Takashi; Hamaguchi, Takehiko; Sugiyama, Nobuaki; and Toura, Kosuke, 4,959,796, Cl. 364-497.000.
Toyo Aluminium Kabushiki Kaisha: *See*—
Kusui, Jun; Kawai, Masahiko; Odani, Yusuke; and Takeda, Yoshinobu, 4,959,195, Cl. 419-67.000.
Toyoda Gosei Co., Ltd.: *See*—
Shigeki, Terumitsu; and Mitsui, Kenichi, 4,958,789, Cl. 248-56.000.
Toyokako Kabushiki Kaisha: *See*—
Tanino, Katsumi; and Nakada, Morihito, 4,959,439, Cl. 528-111.000.
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, to Hitachi, Ltd. Method and apparatus for operating vacuum cleaner. 4,958,406, Cl. 15-319.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Buma, Shuuichi; and Ikemoto, Hiroyuki, 4,958,850, Cl. 280-714.000.
Hashimoto, Eiji, 4,958,604, Cl. 123-276.000.
Trabold, Peter: *See*—
Luft, Gerhard; and Trabold, Peter, 4,959,498, Cl. 562-891.000.
Tracy, Philip A.: *See*—
Kay, Malcolm J.; and Tracy, Philip A., 4,959,558, Cl. 307-354.000.
Trainor, John W.; and Holtje, Bruce E., to Imagitek, Inc. Paddle wheel cross-mixer. 4,959,690, Cl. 355-245.000.

Tramm, Peter C.: *See*—
Wilkes, Colin; Mongia, Hukam C.; and Tramm, Peter C., 4,958,488, Cl. 60-39.550.

Treiber, Fritz F., to Hobart Corporation. Package wrapping method and machine. 4,958,479, Cl. 53-441.000.

Treuner, Uwe D., to E. R. Squibb & Sons, Inc. 2-oxo-[[(substituted sulfonyl)-amino]carbonyl]-azetidines. 4,959,470, Cl. 540-363.000.

Tripp, Lloyd D., Jr., to United States of America, Air Force. Flexible lower body negative pressure trousers for $-G_z$ acceleration protection. 4,959,047, Cl. 600-19.000.

Trombley, Douglas E.; Buslepp, Kenneth J.; Lillie, Cathy C.; and Wancket, Marcel R., to General Motors Corporation. Fuel injection timing control for a crankcase scavenged two-stroke engine. 4,958,609, Cl. 123-478.000.

Trommler, Craig S.; and Finefrock, Mark D., to Bourns Instruments, Inc. Digital piezoresistive pressure transducer. 4,958,520, Cl. 73-727.000.

Troster, Manfred: *See*—
Hofmann, Heinrich; and Troster, Manfred, 4,958,944, Cl. 384-512.000.

Trout, Torence J.: *See*—
Smothers, William K.; Doraiswamy, Krishna C.; Armstrong, Mark L.; and Trout, Torence J., 4,959,283, Cl. 430-1.000.

Trundle, Mark H.; and Jones, William C., to Tennesse Valley Authority. Nozzle dam translocating system. 4,959,192, Cl. 376-260.000.

Truzzi, Sergio; Oldani, Emilio; and Malter, Ugo, to Alfa Lancia S.p.A. Feed device for an internal combustion engine. 4,958,614, Cl. 123-585.000.

Tsai, Ted Y., to International Paper Company. Method of bleaching kraft pulp in a DZED sequence. 4,959,124, Cl. 162-65.000.

Taotsis, Theodore T.: *See*—
Minet, Ronald G.; Taotsis, Theodore T.; and Benson, Sidney W., 4,959,202, Cl. 423-502.000.

Tsuchiya, Sohji: *See*—
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Tsudakoma Corporation: *See*—
Takegawa, Yujiro, 4,958,662, Cl. 139-116.200.

Tsuge, Yukio: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Tsui, Raymond K.: *See*—
Moyer, Curtis D.; and Tsui, Raymond K., 4,959,702, Cl. 357-34.000.

Tsuji, Kazuwo: *See*—
Satoh, Shuichi; and Tsuji, Kazuwo, 4,959,201, Cl. 423-446.000.

Tsuji, Masato, to Alps Electric Co., Ltd. Production of metal base laminate plate including applying an insulator film by powder coating. 4,959,116, Cl. 156-283.000.

Tsuji, Tomohiro: *See*—
Muraoka, Takatoshi; Akira, Nishio; and Tsuji, Tomohiro, 4,958,693, Cl. 177-25.170.

Tsujimoto, Susumu: *See*—
Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, 4,958,546, Cl. 83-848.000.

Tsukamoto, Takeo: *See*—
Abe, Tadashi; Aoki, Masahiro; and Tsukamoto, Takeo, 4,959,428, Cl. 526-201.000.

Tsukaya, Takashi: *See*—
Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, 4,958,639, Cl. 128-660.030.

Tsutsumi, Kazumasu; and Ohba, Shinji, to Yamaha Corporation. Magnetic recording and/or reproducing apparatus having tape loading and unloading mechanism. 4,959,739, Cl. 360-95.000.

Tsutsumi, Kazumasu, to Yamaha Corporation. Rotary head mounting device. 4,959,742, Cl. 360-130.230.

Tsuzuki, Toshiyuki; and Toho, Masato, to Fuji Xerox Co., Ltd. Method and apparatus for color adjustment. 4,959,712, Cl. 358-80.000.

Tuf-Tite, Inc.: *See*—
Meyers, Theodore W., 4,959,145, Cl. 210-532.200.

Tulpule, Bhalchandra R.; and Binnall, Daniel G., to United Technologies Corporation. Access arbitration for an input-output controller. 4,959,782, Cl. 364-200.000.

Tungsram RT: *See*—
Vida, Denes; and Ferenci, Peter, 4,959,588, Cl. 313-625.000.

Turner, James W.; and Glasscock, M. Sidney, to Exxon Production Research Company. Well conductor support structure and method for using. 4,958,960, Cl. 405-195.000.

Turner, Larry G.: *See*—
Mogro-Campero, Antonio; and Turner, Larry G., 4,959,346, Cl. 505-1.000.

Turner, Thomas W.: *See*—
Stone, R. Douglas; and Turner, Thomas W., 4,958,624, Cl. 128-11.000.

Tusche, Karl J. Trailer hitch guide. 4,958,436, Cl. 33-264.000.

Tutiyasu, Kouitirou: *See*—
Ueda, Toshihiko; Tutiyasu, Kouitirou; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, 4,959,824, Cl. 369-44.140.

Tutor Toys, Inc.: *See*—
Thompson, Barbara J.; and Ursery, Jesse, Jr., 4,959,017, Cl. 434-110.000.

Tuzinski, Patrick A.: *See*—
Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Pahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.

Tverdokhlebov, Evgeny N.: *See*—
Gross, Valery N.; Kozhanov, Evgeny V.; Aitkhozhin, Murat A., deceased; Beritashvili, David R.; Tverdokhlebov, Evgeny N.; and Georgiev, Georgy P., 4,959,134, Cl. 204-182.800.

Two-Part Foam Propellants, Inc.: *See*—
Palmert, Steven H.; and Ziems, Robert F., 4,958,750, Cl. 222-135.000.

Tynes, Arthur R.; and Mies, Eric W. Method and apparatus for forming high strength splices in optical fibers. 4,958,905, Cl. 350-96.210.

Tyree, Gerald W.: *See*—
Hatton, Randall C.; and Tyree, Gerald W., 4,958,743, Cl. 220-288.000.

Tyrell, John A.: *See*—
Azelrod, Robert J.; Jaquiss, Donald B. G.; and Tyrell, John A., 4,959,481, Cl. 548-462.000.

UBE Industries: *See*—
Nakatani, Masayuki; Matsuo, Makoto; and Kusuki, Yoshihiro, 4,959,151, Cl. 210-640.000.

Uchida, Hiroshi; Marumo, Kunioemi; and Chaen, Shigehiro, to Showa Denko Kabushiki Kaisha. Novel diallyl terephthalate prepolymer and method for preparing it. 4,959,451, Cl. 528-272.000.

Uchida, Katsuyuki, to Murata Manufacturing Co., Ltd. Organic PTC thermistor. 4,959,632, Cl. 338-22.00R.

Uchida, Koh; and Kurihara, Takashi, to Nissan Motor Company, Limited. Variable assist power steering system. 4,958,695, Cl. 180-142.000.

Uchida, Masanobu: *See*—
Okada, Toshihiko; and Uchida, Masanobu, 4,959,520, Cl. 219-121.480.

Uchihashi, Masatoshi. Attachment connector assembly for hydraulic shovel type excavator. 4,958,981, Cl. 414-694.000.

Uchikawa, Fusaoki: *See*—
Kobayashi, Toshio; Uchikawa, Fusaoki; and Nomura, Kenji, 4,959,347, Cl. 505-1.000.

Uchikubo, Akinobu: *See*—
Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, 4,959,710, Cl. 358-98.000.

Uchinami, Masanobu; Takahashi, Toshihisa; Inoue, Hitoshi; Moronaga, Takahiro; and Nishida, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Air-fuel ratio controller of internal combustion engine. 4,958,611, Cl. 123-479.000.

Uchiyama, Naoki; Nakada, Akio; Taguchi, Akihiro; Hatta, Shinji; Takayama, Syuichi; Tsukaya, Takashi; Takehana, Sakae; Sekino, Naomi; and Hayashi, Masaaki, to Olympus Optical Co., Ltd. Ultrasonic therapeutical apparatus. 4,958,639, Cl. 128-660.030.

Uda, Ikujiro: *See*—
Ueno, Keiji; and Uda, Ikujiro, 4,959,266, Cl. 428-383.000.

Udden, Per: *See*—
Ober, Jan K.; and Udden, Per, 4,958,925, Cl. 351-210.000.

Ueda, Hiroshi: *See*—
Yamamoto, Kouji; Tominaga, Shinji; Yamanaka, Akira; Ueda, Hiroshi; Taniguchi, Nobuyuki; Nakamura, Ikushi; and Iwata, Michihiro, 4,959,679, Cl. 354-419.000.

Ueda, Katsunobu; and Sumiya, Mitsuo, to Kabushiki Kaisha Toshiba. Table equipment. 4,958,815, Cl. 269-58.000.

Ueda, Kazuhiko, to Victor Company of Japan, Ltd. Solid-state imaging apparatus and method of driving the same. 4,959,724, Cl. 358-213.290.

Ueda, Masashi; Makino, Kazumasa; Matsumoto, Yumio; Sago, Akira; Hayakawa, Kiyoharu; and Takagi, Osamu, to Brother Kogyo Kabushiki Kaisha. Cassette for photo-sensistive recording medium. 4,958,781, Cl. 242-71.700.

Ueda, Shinji: *See*—
Sakanoue, Kei; Kobayashi, Hidetoshi; Ichijima, Seiji; and Ueda, Shinji, 4,959,299, Cl. 430-544.000.

Ueda, Toshihiko; Tutiyasu, Kouitirou; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, to Minolta Camera Kabushiki Kaisha. Optical information record/pickup head assembly. 4,959,824, Cl. 369-44.140.

Ueda, Tsunehisa; Miyazaki, Kouji; Natsuume, Tadao; and Miki, Yoshiaki, to Nippon Zeon Co., Ltd. Deodrant composition, deodrant resin composition and deodrant resin shaped article. 4,959,207, Cl. 424-76.100.

Uehara, Masao; Kanno, Masahide; Sasaki, Masahiko; Sasagawa, Katsuyoshi; Uchikubo, Akinobu; Hasegawa, Jun; Yamashita, Shinji; Saito, Katsuyuki; and Nakagawa, Takehiro, to Olympus Optical Co., Ltd. Electronic endoscope whereby the position of the insertable part can be known by a transmitted light outside a body. 4,959,710, Cl. 358-98.000.

Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, to Green Cross Corporation. Monoclonal antibody, process for preparing same, reagent for detecting cancer antigen containing the monoclonal antibody and process for preparing same. 4,959,320, Cl. 435-240.270.

Ueno, Hiroshi: *See*—
Puruhashi, Hiroyuki; Yamamoto, Tadashi; Imai, Masafumi; and Ueno, Hiroshi, 4,959,427, Cl. 526-142.000.

Ueno, Katsumi, to Diesel KIKI Co., Ltd. Hydraulic controller. 4,958,553, Cl. 91-447.000.

Ueno, Keiji; and Uda, Ikujiro, to Sumitomo Electric Industries, Ltd. Urethane-resin coated electrical wire having an intermediate layer. 4,959,266, Cl. 428-383.000.
Ugalde, Rodolfo A.: *See*—
Lombardo, Jorge H.; Smolko, Eduardo E.; Ugalde, Rodolfo A.; and Rivenson, Schoiein, 4,959,211, Cl. 424-93.000.
Uhrman, Robert L., Jr.: *See*—
Diehl, Rodney A.; Uhrman, Robert L., Jr.; Bishop, Robert G.; and Campbell, Donald B., 4,958,537, Cl. 74-606.00R.
Ullman, Timothy J.: *See*—
Gambale, Ronald J.; Hathaway, Susan J.; Longley, Kathryn L.; and Ullman, Timothy J., 4,959,411, Cl. 525-67.000.
Gambale, Ronald J.; and Ullman, Timothy J., 4,959,422, Cl. 525-463.000.
Ulrich, Hannajorg; and Westermann, Lothar, to Hoechst AG. Rinsing composition free from phosphate. 4,959,170, Cl. 252-135.000.
Ultratec, Inc.: *See*—
Engelke, Robert M.; and Colwell, Kevin R., 4,959,847, Cl. 375-121.000.
Umac Incorporated: *See*—
Hagan, Thomas E.; and McGowan, John B., Sr., 4,958,657, Cl. 137-513.500.
Umeda, Takao: *See*—
Mitsuya, Teruaki; Kumasaka, Takao; Umeda, Takao; Hori, Yasuro; Shimokobe, Ikuo; and Hoshi, Nobuyoshi, 4,959,693, Cl. 355-290.000.
Umeki, Yoichiro: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.
Umemura, Kyoichi: *See*—
Tanaka, Hideki; and Umemura, Kyoichi, 4,959,042, Cl. 474-134.000.
Umezono, Kazuaki: *See*—
Hitomi, Mitsuo; Sasaki, Junio; Takai, Akira; Umezono, Kazuaki; and Hinatsae, Fumio, 4,958,606, Cl. 123-316.000.
Umpleby, Jeffrey D., to BP Chemicals Limited. Crosslinkable polymers. 4,959,413, Cl. 525-100.000.
Underwood, David T., to United States Brass Corporation. Stop valve. 4,958,802, Cl. 251-310.000.
Underwood, Gary, to Red Arrow Products Company, Inc. Process for making liquid smoke compositions and resin treated liquid smoke compositions. 4,959,232, Cl. 426-271.000.
Underwood, Joseph W. T., IV; and Rockafeller, Eugene F. Dual input-dual output electric switch. 4,959,554, Cl. 307-38.000.
Union Carbide Chemicals and Plastics Company Inc.: *See*—
Fan, You-Ling; Brode, George L.; and Stanley, James P., 4,959,432, Cl. 526-287.000.
Uniphase Corporation: *See*—
Forge, Charles O., 4,959,606, Cl. 323-286.000.
Unisys Corporation: *See*—
Dzarnoski, John E., Jr.; and Babcock, James W., 4,959,749, Cl. 361-396.000.
United States Brass Corporation: *See*—
Underwood, David T., 4,958,802, Cl. 251-310.000.
United States Gypsum Company: *See*—
Long, William J., 4,959,272, Cl. 428-537.700.
United States of America
Agriculture: *See*—
Brandon, David L.; Bates, Anne H.; and Friedman, Mendel, 4,959,310, Cl. 435-7.000.
Air Force: *See*—
Friedman, Lionel; and Soref, Richard A., 4,958,898, Cl. 350-96.140.
Tripp, Lloyd D., Jr., 4,959,047, Cl. 600-19.000.
Army: *See*—
Bly, Vincent T., 4,959,546, Cl. 250-330.000.
Moody, Harold G., 4,958,697, Cl. 181-129.000.
Puckett, Lawrence J., 4,958,571, Cl. 102-522.000.
Energy: *See*—
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,162, Cl. 252-519.000.
Armes, Steven P.; and Aldissi, Mahmoud, 4,959,180, Cl. 252-519.000.
Dunn, Paul S.; Sheinberg, Haskell; Hogan, Billy M.; Lewis, Homer D.; and Dickinson, James M., 4,959,194, Cl. 419-46.000.
Early, James W., 4,958,921, Cl. 350-354.000.
Kapperman, David S.; Majumdar, Saurindranath; Faber, John F., Jr.; and Singh, J. P., 4,959,548, Cl. 250-390.090.
Meikrantz, David H., 4,959,158, Cl. 210-787.000.
Miura, Michiko; and Gabel, Detlef, 4,959,356, Cl. 514-64.000.
Ziolkowski, Richard W., 4,959,559, Cl. 307-425.000.
Environmental Protection Agency: *See*—
Nelson, Michael J. K.; Bourquin, Al W. J.; and Pritchard, Parmely H., 4,959,315, Cl. 435-167.000.
Interior: *See*—
Engelmann, William H.; Watson, Pamela J.; Tuzinski, Patrick A.; Fahlman, John E.; and Khalafalla, Sanaa E., 4,959,164, Cl. 252-8.510.
National Aeronautics and Space Administration: *See*—
Barnes, Norman P., 4,959,838, Cl. 372-25.000.
Kumar, Rajendra, 4,959,656, Cl. 342-418.000.
Wolverton, Billy C.; and Jarrell, Lamont R., 4,959,084, Cl. 55-68.000.
Navy: *See*—
Bowling, Donald R.; and Smith, Charles F., 4,959,614, Cl. 324-636.000.
Divecha, Amarnath P.; Ferrando, William A.; Hesse, Philip W.; and Karmarkar, Subhash D., 4,958,763, Cl. 228-193.000.
Hofler, Thomas J.; and Garrett, Steven L., 4,959,539, Cl. 250-227.190.
Murphree, Francis J., 4,959,817, Cl. 367-97.000.
Palmer, Herbert A., 4,959,638, Cl. 340-577.000.
Rose, James D.; and Suder, William H., III, 4,958,970, Cl. 411-12.000.
Simonson, Lloyd G., 4,959,304, Cl. 435-7.000.
U.S. Philips Corp.: *See*—
Brinkmeyer, Ernst; Fuchs, Manfred; Brennecke, Wolfgang; and Dargatz, Wilhelm, 4,958,896, Cl. 350-96.130.
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Urheim, John E., to Gynex, Inc. Package for oral contraceptive tablet. 4,958,736, Cl. 206-531.000.
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Del Monte, Philip J.; and Vanwey, Jackie L., 4,959,853, Cl. 379-180.000.
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Voll, Horst, to FAG Kugelfischer Georg Schafer (KGaA). Separation for ball bearings. 4,958,946, Cl. 384-523.000.
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Lubisch, Wilfried; Binnig, Fritz; and von Philipsborn, Gerda, 4,959,373, Cl. 514-300.000.
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VTC Incorporated: *See*—
Shier, John S., 4,959,618, Cl. 328-155.000.
Shier, John S.; and Schmidt, Matthew F., 4,959,697, Cl. 357-22.000.
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Odahashian, Robert A., 4,958,735, Cl. 206-497.000.
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Wabash National Corporation: *See*—
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Cayrim, Henner; and Felsen, Peter, 4,959,750, Cl. 361-401.000.
Wada, Hirohumi, to Hitachi, Ltd. Digital signal processor. 4,959,815, Cl. 365-230.060.
Waddington, Richard. Roof tile securing means. 4,958,471, Cl. 52-546.000.
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Waldock, Kevin H., to Submarine and Surface Blaster Pty. Limited. Explosive compositions and method utilizing bulking and gassing agents. 4,959,108, Cl. 149-2.000.
Walker, James B., to Du Pont de Nemours, E. I., and Company. Reverse osmosis concentration of juice products with improved flavor. 4,959,237, Cl. 426-330.500.
Walker, Louis L.; and Larson, Paul A., to Dow Chemical Company, The. Laminating varnish composition containing a difunctional epoxy resin, a polyfunctional epoxy resin, a difunctional phenol and a polyfunctional phenol and a solvent. 4,959,425, Cl. 525-482.000.
Walker, Nigel G., to British Telecommunications public limited company. Optical signal control method and apparatus. 4,958,918, Cl. 350-378.000.
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Wallick, Claude R., Jr.; Schmitt, Thomas J.; Bogart, Bruce E.; and Krebs, John L., to Emerson Electric Co. Method and apparatus for treating ladder rungs for forming assembly with ladder rails. 4,959,107, Cl. 148-13.000.
Walp, Patrick K., to AMP Incorporated. Clock recovery circuit for digital demodulator. 4,959,844, Cl. 375-97.000.
Walser, Armin, to Hoffmann-La Roche Inc. Triazolo(4,3-A)(1,4)benzodiazepines and thieno (3,2-F)(1,2,4)triazolo(4,3-A)(1,4)diazepine compounds which have useful activity as platelet activating factor (PAF) antagonists. 4,959,361, Cl. 514-220.000.
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Ward, Terence J., to John Wyeth & Brothers Limited. Piperidine derivatives useful as 5-HT_3 antagonists. 4,959,375, Cl. 514-323.000.

Ward, William F., Jr., to Ward Machinery Company, The. Adjustable feed rolls for feeding sheets. 4,958,829, Cl. 271-273.000.

Warner, John J., to W. R. Grace & Co.-Conn. High profile shrink package. 4,958,480, Cl. 53-433.000.

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Wong, Lucy L.; Faust, Steven M.; and Cherukuri, Subraman R., 4,959,225, Cl. 426-3.000.

Warner & Swasey Company, The: *See*—
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Washam, Clinton J.: *See*—
Reddy, Malireddy S.; Mullen, John; Washam, Clinton J.; Brown, C. Gordon; and Hunt, Charles C., 4,959,229, Cl. 426-39.000.

Wass, Lloyd G. Puncture disc inflation valve with improved cutting bayonet. 4,959,034, Cl. 441-41.000.

Wasulko, William M., to National Starch and Chemical Investment Holding Corporation. Pre-patterned circuit board device-attach adhesive transfer system. 4,959,008, Cl. 428-40.000.

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Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, 4,959,672, Cl. 354-173.100.

Watanabe, Hisao: *See*—
Ohta, Hiroki; Sato, Katsutoshi; Matsumoto, Susumu; Ishii, Kazuo; Miura, Yumiko; Watanabe, Hisao; Suzuki, Seiichi; Umeki, Yoichiro; and Hanabe, Hiroshi, 4,959,092, Cl. 71-88.000.

Watanabe, Jinzo, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor memory device with capacitor on opposite surface of substrate. 4,959,709, Cl. 357-23.600.

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Uemura, Yahiro; Fukuyama, Kazumi; Kobayashi, Takashi; Kanou, Yoshiaki; Yamana, Ryutaro; Kashiwagi, Eiji; Taniguchi, Tomokuni; Nakura, Kazuaki; Watanabe, Masahiro; Nishida, Masayuki; and Suyama, Tadakazu, 4,959,320, Cl. 435-240.270.

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Watanabe, Syuji: *See*—
Toyoshima, Hisanori; Jyoraku, Fumio; Ishii, Yoshitaro; Tahara, Kazuo; Koharagi, Haruo; Watanabe, Syuji; Saito, Kouichi; Miyashita, Kunio; Endo, Tunehiro; and Hishi, Wakichiro, 4,958,406, Cl. 15-319.000.

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Watters, Jeffrey S.; Brown, Norman P.; and Nuckols, James H., to Compaq Computer Corporation. Power-on password functions for computer system. 4,959,860, Cl. 380-4.000.

Way, Brian M.: *See*—
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Weaver, James C.; Blias, Jonathan G.; Williams, Gregory B.; Powell, Kevin T.; and Harrison, Gail L., to Massachusetts Institute of Technology. Process for rapidly enumerating viable entities. 4,959,301, Cl. 435-5.000.

Webber, Kenneth M.: *See*—
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Weber, Larry B.; Hansen, Craig C.; Riordan, Thomas J.; and Przybylski, Steven A., to Mips Computer Systems, Inc. Dual byte order computer architecture a functional unit for handling data sets with different byte orders. 4,959,779, Cl. 364-200.000.

Weber, Peter G.: *See*—
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Daum, Lothar; Keilhauer, Gerhard; Lorenz, Gisela; Ammermann, Eberhard; Weber, Wolfgang; Steglich, Wolfgang; Steffan, Bert; and Scherer, Angela, 4,959,484, Cl. 549-334.000.
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Wegner, Peter; Kruger, Martin; Johann, Gerhard; Rusch, Reinhart; Rees, Richard; Head, John; and Rowson, Graham, to Schering Aktiengesellschaft. 1-chloropyrimidinyl-1H-1,2,4-triazole-3-sulphonamides as herbicides. 4,959,094, Cl. 71-92.000.

Weihrauch, Georg, to Coronet-Werke Heinrich Schlerf GmbH. Bristle article. 4,958,402, Cl. 15-159.00A.

Weinberg, Alan, to Agence Spatiale Europeenne. DC to DC converter using quasi-resonance. 4,959,765, Cl. 363-20.000.

Weinstein, Philip M. Carbonless transfer sheets for multi-part forms packs. 4,959,343, Cl. 503-200.000.

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Wengler, Roger L. L.: *See*—
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Wentland, Mark P., to Sterling Drug Inc. Quinolonecarboxamide compounds, their preparation and use as antivirals. 4,959,363, Cl. 514-235.200.

Wenzel, Andreas, to Fire-Generation Establishment. Ski boot with insert piece. 4,958,448, Cl. 36-119.000.

Wessel, Jurgen: *See*—
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Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, 4,959,672, Cl. 354-173.100.

Westermann, Lothar: *See*—
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Westinghouse Electric Corp.: *See*—
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Colquitt, Leroy, Jr.; Sutherland, Fred R.; and Boling, Edward J., 4,959,701, Cl. 357-24.000.
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Westphalen, Karl-Otto: *See*—
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Whaley, Paul W., to University of Nebraska, The Board of Regents of the. Velocimeter. 4,958,519, Cl. 73-505.000.

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Yonekura, Mikio, to Fanuc Ltd. Bus regulating system. 4,959,775, Cl. 364-200.000.

Yoneyama, Keiko: *See*—
Miura, Konoe; Ozawa, Tetsuo; and Yoneyama, Keiko, 4,959,172, Cl. 252-299.100.

Yos, Geza E.: *See*—
Toth, Laszlo P.; Kiss, Endrene ; Pasztor, Endre; Purebl, Gyoray; Kormendy, Agoston; Mares, Gyula; Yos, Geza E.; and Horvath, Bela, 4,958,766, Cl. 237-12.30B.

Yoshida, Akihiko; and Yamada, Naohito, to NGK Insulators, Ltd. Joined metal-ceramic assembly method of preparing the same. 4,959,258, Cl. 428-192.000.

Yoshida, Hiroichi: *See*—
Taguchi, Yasuhiro; and Yoshida, Hiroichi. 4,959,643, Cl. 340-721.000.

Yoshida, Kazuyuki: *See*—
Ueda, Toshihiko; Tutiyasu, Kouitirou; Yoshida, Kazuyuki; and Yagoto, Mitsutoshi, 4,959,824, Cl. 369-44.140.

Yoshida Kogyo K.K.: *See*—
Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, 4,959,598, Cl. 318-599.000.

Yoshida, Shinya: *See*—
Nagata, Masanori; Yoshida, Shinya; Yamashita, Susumu; and Okahashi, Makoto, 4,959,788, Cl. 364-408.000.

Yoshida, Sumio; Takegawa, Yoshikazu; Tsujimoto, Susumu; and Kawabata, Katsuhiko, to Amada Company, Limited. Saw blade. 4,958,546, Cl. 83-848.000.

Yoshida, Susumu; Higashi, Tatsuji; and Takahashi, Hiroshi, to Fuji Photo Film Co., Ltd. Process for the development of dry PS plates. 4,959,296, Cl. 430-302.000.

Yoshida, Yukio; Takimoto, Akiyoshi; and Murai, Shigenobu, to Yoshida Kogyo K.K. Method and apparatus for controlling torque of a door opening and closing motor for an automatic door. 4,959,598, Cl. 318-599.000.

Yoshimura, Shigeru; Suzuki, Tetsuo; and Takemura, Makoto, to Canon Kabushiki Kaisha. Image forming apparatus having a platen and recording means elastically pressed together. 4,959,666, Cl. 346-136.000.

Yoshimura, Shigeru: *See*—
Suzuki, Tetsuo; Takemura, Makoto; and Yoshimura, Shigeru, 4,959,660, Cl. 346-1.100.

Yoshimura, Susumu: *See*—
Kudoh, Yasuo; Tsuchiya, Sohji; Kojima, Toshikuni; Fukuyama, Masao; Yoshimura, Susumu; and Kuranuki, Kenji, 4,959,753, Cl. 361-525.000.

Yoshino, Kunihisa: *See*—
Haneda, Satoshi; Shoji, Hisashi; and Yoshino, Kunihisa, 4,959,669, Cl. 346-157.000.

Yoshino, Takashi: *See*—
Onozuka, Kuniharu; and Yoshino, Takashi, 4,958,836, Cl. 273-184.00R.

Yoshino, Tsunemi; Furutsuka, Naoyuki; Aoki, Naofumi; Watanabe, Hiroshi; and Morioka, Akitoshi, to West Electric Company, Ltd. Motor-driven film winder. 4,959,672, Cl. 354-173.100.

Yoshioka, Masanori; and Kozai, Masafumi, to Nissan Motor Company, Ltd. Method for blow molding large hollow bodies. 4,959,191, Cl. 264-529.000.

Yoshitake, Noriaki: *See*—
Saeki, Kenshi; Ogino, Takao; Yoshitake, Noriaki; Honda, Takumi; Nishihara, Akira; Okita, Hiroshi; Tsuge, Yukio; and Iizuka, Haruo, 4,959,277, Cl. 428-623.000.

Yoshiura, Hiroshi; Chusho, Takeshi; Masui, Shoichi; and Ohata, Hideo, to Hitachi, Ltd. Inference method and system. 4,959,799, Cl. 364-513.000.

Yosida, Nobuo; and Shimizu, Teruhisa, to Hitachi, Ltd. Semiconductor memory. 4,959,835, Cl. 371-51.100.

Youssefyeh, Raymond D.; Campbell, Henry F.; and Kuhla, Donald E., to Rorer Pharmaceutical Corporation. Hexahydrodibenzofuran carboxylic acid derivatives. 4,959,485, Cl. 549-461.000.

Yu Lu, Shi-da: *See*—
Mark, David F.; Lin, Leo S.; Yu Lu, Shi-da; and Wang, Alice M., 4,959,314, Cl. 435-69.100.

Yu, Shande: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.

Yugen Kaisha Shinjoseisakusho: *See*—
Shinjo, Katsumi, 4,958,972, Cl. 411-387.000.

Yugenkaisha Idearesearch: *See*—
Kawamura, Yuzo; and Nakagawa, Sigeo, 4,958,678, Cl. 164-461.000.

Yukawa, Hideki: *See*—
Saito, Akihiko; and Yukawa, Hideki, 4,958,608, Cl. 123-427.000.

Yukawa, Seiichi: *See*—
Saito, Hirokazu; Yukawa, Seiichi; Sato, Takashi; Ushirokozi, Kiyoyuki; Aoyagi, Nobutoshi; Suzuki, Tomio; and Tanaka, Minoru, 4,958,934, Cl. 366-145.000.

Zajac, John P., to Tegal Corporation. Mass flow stabilized. 4,958,658, Cl. 137-613.000.

Zajec, Jozef-Franc: *See*—
Hannen, Jakob; Zajec, Jozef-Franc; and Piesen, Stephan, 4,958,478, Cl. 53-415.000.

Zakich, Paul. Cooler-extruder device. 4,958,933, Cl. 366-81.000.

Zalar, Frank E.: *See*—
Arsena, Vito J.; Clough, Harvey C.; and Zalar, Frank E., 4,959,583, Cl. 313-113.000.

Zamzow, Larry A. Truck pocket rail attachment. 4,958,875, Cl. 296-32.000.

Zanxs, Inc.: *See*—
Forish, John A.; and Rogers, John J., 4,958,429, Cl. 29-877.000.

Zaslavsky, Gregory: *See*—
Barakitis, Nikolaos; Cohen, Sheppard; and Zaslavsky, Gregory, 4,959,589, Cl. 315-58.000.

Zavracky, Paul M.; and Morrison, Richard H., Jr., to Foxboro Company, The. Micromechanical electric shunt and encoding devices made therefrom. 4,959,515, Cl. 200-181.000.

Zenji Hagiwara: *See*—
Hagiwara, Zenji; Ando, Satoshi; Ichihashi, Kunio; and Dono, Akira, 4,959,268, Cl. 428-403.000.

Zenner, Bruce D.; Ciccone, Joseph P.; De Castro, Emory S.; Deardurff, Larrie A.; and Kerr, John B., to Aquanautics Corporation. Polyalkylamine complexes for ligand extraction and generation. 4,959,135, Cl. 204-129.000.

Zhang, Qingyuan: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.

Zhou, Shicheng: *See*—
Tong, Wuwei; Sun, Deyu; Zhang, Qingyuan; Wu, Lielai; Zhou, Shicheng; Yu, Shande; Du, Daoji; and Yang, Shili, 4,959,126, Cl. 201-2.000.

Ziegler, Georg, to Sulzer Brothers Limited. Hot-gas cooling plant. 4,959,078, Cl. 48-128.000.

Zielske, Alfred G.: *See*—
Fong, Ronald A.; Lewis, Sheldon N.; Wiersema, Richard J.; and Zielske, Alfred G., 4,959,187, Cl. 260-402.000.

Ziems, Robert F.: *See*—
Palmert, Steven H.; and Ziems, Robert F., 4,958,750, Cl. 222-135.000.

Zimmer, Inc.: *See*—
Dunn, Harold K.; Lazzeri, Mark A.; and Ondria, Jeffrey M., 4,959,066, Cl. 606-89.000.

Zimmer, Oswald K.; Vollenberg, Werner P.; Loschen, Gerriet K. H.; Winter, Werner; Kiesewetter, Erwin O.; and Seippl, Ulrich G. P., to Gruenenthal GmbH. Phenol derivatives, pharmaceutical compositions containing these compounds and processes for the preparation of these compounds and compositions. 4,959,391, Cl. 514-546.000.

Ziolkowski, Richard W., to United States of America, Energy. Electromagnetic or other directed energy pulse launcher. 4,959,559, Cl. 307-425.000.

Zlatanov, Ivo Y.: *See*—
Yankov, Lyuben K.; Filipova, Stefka K.; Zlatanov, Ivo Y.; and Budevski, Evgeni B., 4,959,396, Cl. 521-61.000.

Zoecon Corporation: *See*—
Tate, Lloyd, 4,958,452, Cl. 40-301.000.

Zoerner, Walter: *See*—
Drosdziok, Armin; Sauer, Harry; and Zoerner, Walter, 4,958,679, Cl. 165-13.000.

Zondler, Helmut; and Kunz, Walter, to Ciba-Geigy Corporation. Compositions for protecting plants against disease. 4,959,096, Cl. 514-356.000.

Zucker, Friedhelm: *See*—
Morimoto, Yasuaki; and Zucker, Friedhelm, 4,959,821, Cl. 369-13.000.

ZymoGenetics, Inc.: *See*—
Foster, Donald C.; Murray, Mark J.; and Berkner, Kathleen L., 4,959,318, Cl. 435-69.100.

3900 Corp.: *See*—
Heckethorn, John E.; and Whittle, Danny J., 4,958,419, Cl. 24-283.000.

501 Hitachi Metals, Ltd.: *See*—
Oshima, Masahiko; Ohata, Takumi; and Hatori, Toshiyuki, 4,958,422, Cl. 29-129.500.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 25TH DAY OF SEPTEMBER, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Abe, Kazuki: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Baker, Richard W.: *See*—
Roman, Ian C.; and Baker, Richard W., Re. 33,352, Cl. 55-38.000.

Bend Research, Inc.: *See*—
Roman, Ian C.; and Baker, Richard W., Re. 33,352, Cl. 55-38.000.

Brauer, Melvin: *See*—
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.

Brindak, Nicholas J.: *See*—
Knudsen, James G.; and Brindak, Nicholas J., Re. 33,346, Cl. 73-61.200.

CasChem, Inc.: *See*—
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.

Chao, Jerry C.: *See*—
Downey, William J.; Brauer, Melvin; and Chao, Jerry C., Re. 33,354, Cl. 428-375.000.

Downey, William J.; Brauer, Melvin; and Chao, Jerry C., to CasChem, Inc. Process for using ester plasticized polyurethanes for sealing electrical devices. Re. 33,354, Cl. 428-375.000.

Drew Chemical Corporation: *See*—
Knudsen, James G.; and Brindak, Nicholas J., Re. 33,346, Cl. 73-61.200.

Ellington, William E.: *See*—
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.

Enoshita, Ryosuke: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Fleming, Henry C., III: *See*—
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.

Heinecke, Steven B., to Minnesota Mining and Manufacturing Company. Thin film surgical dressing with delivery system. Re. 33,353, Cl. 428-40.000.

Himeno, Takuji: *See*—
Tanaka, Masato; and Himeno, Takuji, Re. 33,356, Cl. 341-72.000.

Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, to Mitsui Toatsu Chemicals, Incorporated. Agent for absorbing and releasing water vapor. Re. 33,355, Cl. 524-434.000.

Johnson, Johnny, III. Air-driven ceiling fan. Re. 33,347, Cl. 98-40.050.

Kamio, Hideo: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Key Technology, Inc.: *See*—
Randall, Malcolm W., Re. 33,357, Cl. 358-106.000.

Knudsen, James G.; and Brindak, Nicholas J., to Drew Chemical Corporation. Process and apparatus for testing fluids for fouling. Re. 33,346, Cl. 73-61.200.

Kobayashi, Sadao: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Lower, Jerry L., to Zimmer, Inc. Bone screw. Re. 33,348, Cl. 606-65.000.

Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, to Shell Oil Company. Controlling sulfide scavenger content of drilling fluid. Re. 33,349, Cl. 175-40.000.

Minnesota Mining and Manufacturing Company: *See*—
Heinecke, Steven B., Re. 33,353, Cl. 428-40.000.

Mitsui Toatsu Chemicals, Incorporated: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Nakagawa, Toshimi: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Nitta, Atsuhiko: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Ouchi, Takahiro: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Papajohn, Elissa D. Menstrual and incontinence pad. Re. 33,351, Cl. 604-387.000.

Randall, Malcolm W., to Key Technology, Inc. Optical inspection apparatus for moving articles. Re. 33,357, Cl. 358-106.000.

Roman, Ian C.; and Baker, Richard W., to Bend Research, Inc. Absorption process for producing oxygen and nitrogen and solution therefor. Re. 33,352, Cl. 55-38.000.

Shell Oil Company: *See*—
Matza, Stephen D.; Ellington, William E.; and Fleming, Henry C., III, Re. 33,349, Cl. 175-40.000.

Sony Corporation: *See*—
Tanaka, Masato; and Himeno, Takuji, Re. 33,356, Cl. 341-72.000.

Stuart, David H.: *See*—
Whitaker, Richard A.; and Stuart, David H., Re. 33,350, Cl. 280-624.000.

Tanaka, Masato; and Himeno, Takuji, to Sony Corporation. Frequency modulation coding methods with reduced transition intervals. Re. 33,356, Cl. 341-72.000.

Tanaka, Tomio: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Uejima, Tamotu: *See*—
Itoh, Hiroshi; Nakagawa, Toshimi; Nitta, Atsuhiko; Tanaka, Tomio; Kamio, Hideo; Enoshita, Ryosuke; Uejima, Tamotu; Ouchi, Takahiro; Abe, Kazuki; and Kobayashi, Sadao, Re. 33,355, Cl. 524-434.000.

Whitaker, Richard A.; and Stuart, David H. Ski binding having preset means and detent trigger for said preset means. Re. 33,350, Cl. 280-624.000.

Zimmer, Inc.: *See*—
Lower, Jerry L., Re. 33,348, Cl. 606-65.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Conrad, Peter G., to CTL, Inc. Composite thread line sails. B1 4,708,080, 9-25-90, Cl. 114-103.000.

Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., to Purdue Research Foundation. Exercise responsive cardiac pacemaker. B1 4,436,092, 9-25-90, Cl. 128-419.0PG.

CTL, Inc.: *See*—
Conrad, Peter G., B1 4,708,080, Cl. 114-103.000.

Datascope Corp.: *See*—
Hanson, Bruce L.; and Wolvek, Sidney, B1 4,261,339, Cl. 606-194.000.

Fearnot, Neal E.: *See*—
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
Geddes, Leslie A.: *See*—
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
Hanson, Bruce L.; and Wolvek, Sidney, to Datascope Corp. Balloon catheter with rotatable support. B1 4,261,339, 9-25-90, Cl. 606-194.000.
Interface, Inc.: *See*—
Tibbals, Edward C., Jr., B1 4,848,725, Cl. 251-129.020.
Kudlacek, Donald S. Compound archery bow with eccentric cam elements. B1 4,060,066, 9-25-90, Cl. 124-25.600.
Purdue Research Foundation: *See*—
Cook, William A.; Fearnot, Neal E.; and Geddes, Leslie A., B1 4,436,092, Cl. 128-419.0PG.
Tibbals, Edward C., Jr., to Interface, Inc. Valve construction. B1 4,848,725, 9-25-90, Cl. 251-129.020.
Wolvek, Sidney: *See*—
Hanson, Bruce L.; and Wolvek, Sidney, B1 4,261,339, Cl. 606-194.000.

LIST OF DESIGN PATENTEES

Allen, Kelly M.: *See*—
Freiberger, John G., Jr.; and Allen, Kelly M., 310,852, Cl. D21-69.000.
Alpha Products, Inc.: *See*—
Scott, Leon J., III, 310,781, Cl. D9-398.000.
Anderson, Robert S., to Premium Plastics, Inc. Waste receptacle. 310,903, 9-25-90, Cl. D34-9.000.
Artemide S.p.A.: *See*—
Giamondi, Ernesto; and Bissell, John T., 310,886, Cl. D26-65.000.
Ashley Furniture Industries, Inc.: *See*—
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
Asselbergs, Christophe K. J., to Suncourt Holdings Inc. Fan. 310,873, 9-25-90, Cl. D23-370.000.
Au, Nelson S.: *See*—
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
Baader, Joseph E. Housing for dual vehicle warning lights. 310,885, 9-25-90, Cl. D26-139.000.
Beeman, Everett C., to Innopak Plastics Corporation. Bottle. 310,783, 9-25-90, Cl. D9-404.000.
Bell Bicycles Inc.: *See*—
Broersma, Lester V., 310,893, Cl. D29-12.000.
Bell, Michael R. Fastener for use in maintaining tension in a clothesline or similar article. 310,897, 9-25-90, Cl. D32-60.000.
Bergen, Robert G.: *See*—
Larkin, Mark E.; and Bergen, Robert G., 310,881, Cl. D24-51.000.
Bergeron, Robert M. Propeller hub extrusion. 310,812, 9-25-90, Cl. D12-214.000.
Bissell, John T.: *See*—
Gismondi, Ernesto; and Bissell, John T., 310,886, Cl. D26-65.000.
Blumberg, Thomas A.: *See*—
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Boivin, Josette. Scarf slide. 310,794, 9-25-90, Cl. D11-202.000.
Boivin, Josette. Scarf slide. 310,795, 9-25-90, Cl. D11-202.000.
Boivin, Josette. Scarf slide. 310,796, 9-25-90, Cl. D11-203.000.
Bolle, Maurice, to Etablissements Bolle S.N.C. Pair of sunglasses. 310,839, 9-25-90, Cl. D16-102.000.
Botich, Michael J.: *See*—
Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, 310,806, Cl. D12-156.000.
Boyle, Dennis J.: *See*—
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
Breger, Carl-Arne, to Holmens Bruk Aktiebolag. Roller dispenser. 310,758, 9-25-90, Cl. D6-518.000.
Breger, Carl-Arne, to Holmens Bruk Aktiebolag. Toilet paper dispenser. 310,759, 9-25-90, Cl. D6-523.000.
Bridgestone Corporation: *See*—
Hayakawa, Toshio; and Hashimoto, Hideaki, 310,805, Cl. D12-151.000.
Himuro, Yasuo; and Tateo, Yuji, 310,802, Cl. D12-147.000.
Broersma, Lester V., to Bell Bicycles Inc. Cyclist's ventilated helmet. 310,893, 9-25-90, Cl. D29-12.000.
Brown, Douglas C.: *See*—
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
Brunton Company, The: *See*—
Iden, Marlin D., 310,787, Cl. D10-53.000.
C.C. Creative Consulating S.A.: *See*—
Hendrikx, Peter, 310,850, Cl. D21-41.000.
Hendrikx, Peter, 310,851, Cl. D21-41.000.
Cain, Sherna F., to Triple H Industries, Inc. Air freshener doll. 310,872, 9-25-90, Cl. D23-368.000.
Carthew, Millie A.: *See*—
Collins, Christopher G.; and Carthew, Millie A., 310,774, Cl. D9-305.000.
Cason, Larry. Retractable ski rope reel mate. 310,776, 9-25-90, Cl. D8-358.000.
Castagna, John F., to Sparkomatic Corporation. Light bar assembly for vehicle roofs. 310,793, 9-25-90, Cl. D10-114.000.
Century Products Company: *See*—
Sedlack, Mark, 310,869, Cl. D23-296.000.
Chabala, Leonard V.; and Rogers, Edward J., to S&C Electric Company. Interrupter switch. 310,823, 9-25-90, Cl. D13-175.000.
Colgate-Palmolive Company: *See*—
Paciullo, Francis P.; and Rivera, Ligia A., 310,901, Cl. D32-40.000.
Paciullo, Francis P.; and Rivera, Ligia A., 310,902, Cl. D32-40.000.
Collins, Christopher G.; and Carthew, Millie A., to Collins, Christopher G. Recloasble debris bag with debris trap. 310,774, 9-25-90, Cl. D9-305.000.
Concialdi, Thomas. Combination razor and shaving cream dispenser. 310,889, 9-25-90, Cl. D28-45.000.
Constance, Patricia, to Nabisco Brands, Inc. Zebra cookie. 310,750, 9-25-90, Cl. D1-128.000.
Cooper, Brian G.: *See*—
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., to Goodyear Tire & Rubber Company, The. Tire. 310,804, 9-25-90, Cl. D12-147.000.
Craft, Charles W., Jr.: *See*—
Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., 310,761, Cl. D6-567.000.
Crease, Pierre L.; and Stephan, Werner B., to NCR Corporation. Modular personal computer system or similar article. 310,825, 9-25-90, Cl. D14-100.000.
Creative Point, Inc.: *See*—
Long, Jerry M.; and Palmer, Peter J., 310,752, Cl. D3-35.000.
CritiCard, Inc.: *See*—
Davis, Jeffrey B., 310,849, Cl. D20-22.000.
Culbertson, Richard; and Schaefer, Henry A., to Ericsson GE Mobile Communications Inc. Battery for a portable radio. 310,813, 9-25-90, Cl. D13-103.000.
Dalbec, Bradley E. Lighted marker buoy. 310,792, 9-25-90, Cl. D10-107.000.
Danek, Robert J., to General Electric Company. Programmable electronic circuit breaker. 310,822, 9-25-90, Cl. D13-/160.000.
Dart Industries Inc.: *See*—
Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., 310,854, Cl. D21-105.000.
Davis, Jeffrey B., to CritiCard, Inc. Medical information tag. 310,849, 9-25-90, Cl. D20-22.000.
Debus, Inc.: *See*—
Williamson, Nicholas, 310,778, Cl. D9-367.000.
Degnan, Donald E. Door viewer. 310,840, 9-25-90, Cl. D16-134.000.
Delepine, Jean-Claude. Elongated shower head with plural spray nozzles. 310,860, 9-25-90, Cl. D23-213.000.
Dietz, Robert E. Message holder. 310,847, 9-25-90, Cl. D19-90.000.
Dinges, George N., to Patco, Inc. Cart for snowmobiles or the like. 310,904, 9-25-90, Cl. D34-12.000.
Durand, Jean-Jacques. Perfume bottle. 310,782, 9-25-90, Cl. D9-404.000.
Durand, Philippe J. Plate or similar article. 310,766, 9-25-90, Cl. D7-564.000.
Dynabook Technologies Corporation: *See*—
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
EGA Limited: *See*—
Layton, David E., 310,824, Cl. D13-152.000.
Egan, William E.: *See*—
Maxwell, Paul B.; and Egan, William E., 310,801, Cl. D12-146.000.
Ellis, Kenneth W. Finger splint. 310,883, 9-25-90, Cl. D24-64.000.
Embree, Donald; and Hamann, David L., to Rubbermaid Incorporated. Wrench rack. 310,762, 9-25-90, Cl. D6-569.000.

Ericsson GE Mobile Communications Inc.: *See—*
Culbertson, Richard; and Schaefer, Henry A., 310,813, Cl. D13-103.000.
Etablissements Bolle S.N.C.: *See—*
Bolle, Maurice, 310,839, Cl. D16-102.000.
Ewig, John F., to Parker Manufacturing Company. Electric stapler. 310,771, 9-25-90, Cl. D8-69.000.
Fairchild Space and Defense Corporation: *See—*
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
Farrell, Richard; and Soloway, Richard, to Napco Security Systems, Inc. Keyboard and display panel for an intrusion detection system. 310,791, 9-25-90, Cl. D10-106.000.
Figur, Bernd: *See—*
Stutzer, Franz-A.; and Figur, Bernd, 310,765, Cl. D7-362.000.
Finley, Karola. Combined hat and party blowout. 310,751, 9-25-90, Cl. D2-514.000.
Forbes, Hampton E., Jr., to Westvaco Corporation. Tear strip carton. 310,784, 9-25-90, Cl. D9-416.000.
Forbes, Hampton E., Jr., to Westvaco Corporation. Tear strip carton. 310,785, 9-25-90, Cl. D9-416.000.
Frady, Steve A. Slate shingle remover. 310,773, 9-25-90, Cl. D8-89.000.
Fratelli Guzzini S.p.A.: *See—*
Minuti, Furio, 310,767, Cl. D7-631.000.
Freiberger, John G., Jr.; and Allen, Kelly M. Simulative rocker. 310,852, 9-25-90, Cl. D21-69.000.
General Electric Company: *See—*
Danek, Robert J., 310,822, Cl. D13-/160.000.
General Motors Corporation: *See—*
North, David R.; and Stewart, Charles H., 310,811, Cl. D12-206.000.
Gingras, Eric, to Rubbermaid Commercial Products Inc. Brush block and handle unit. 310,754, 9-25-90, Cl. D4-138.000.
Gioscia, Richard; and Hino, Ichiro, to Sony Corporation. Television receiver. 310,832, 9-25-90, Cl. D14-131.000.
Gismondi, Ernesto; and Bissell, John T., to Artemide S.p.A. Articulated table lamp. 310,886, 9-25-90, Cl. D26-65.000.
Globe-Union Inc.: *See—*
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
Gloeckler, Rolf W., to Henkel Kommanditgesellschaft auf Aktien. Combined deodorant bottle and cap. 310,779, 9-25-90, Cl. D9-377.000.
Goodyear Tire & Rubber Company, The: *See—*
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
Graas, Maurice, 310,800, Cl. D12-137.000.
Maxwell, Paul B.; and Egan, William E., 310,801, Cl. D12-146.000.
Graas, Maurice, to Goodyear Tire & Rubber Company, The. Tire. 310,800, 9-25-90, Cl. D12-137.000.
Grimes, Gary E., to U.S. Philips Corporation. Combined radio and cassette recorder. 310,835, 9-25-90, Cl. D14-163.000.
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., to Dynabook Technologies Corporation. Personal computer. 310,828, 9-25-90, Cl. D14-106.000.
Hamann, David L.: *See—*
Embree, Donald; and Hamann, David L., 310,762, Cl. D6-569.000.
Hammond, Philip S.: *See—*
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
Hasegawa, Hirotsugu, to Sumitomo Rubber Industries, Ltd. Automobile tire. 310,803, 9-25-90, Cl. D12-147.000.
Hashimoto, Hideaki: *See—*
Hayakawa, Toshio; and Hashimoto, Hideaki, 310,805, Cl. D12-151.000.
Hayakawa, Toshio; and Hashimoto, Hideaki, to Bridgestone Corporation. Automobile tire. 310,805, 9-25-90, Cl. D12-151.000.
Heald, Edward E.: *See—*
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
Hendrikx, Peter, to C.C. Creative Consulating S.A. Simulative die. 310,850, 9-25-90, Cl. D21-41.000.
Hendrikx, Peter, to C.C. Creative Consulating S.A. Simulative die. 310,851, 9-25-90, Cl. D21-41.000.
Hengesbach, Robert W. Combined curved wand tip with swivel-mounted nozzle. 310,861, 9-25-90, Cl. D23-213.000.
Henkel Kommanditgesellschaft auf Aktien: *See—*
Gloeckler, Rolf W., 310,779, Cl. D9-377.000.
Herron, Matthew A.: *See—*
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, to Zipper Project, Inc. Telescopic camper cap. 310,806, 9-25-90, Cl. D12-156.000.
Hijo De E.F. Escofet S.A.: *See—*
Paris, Emilio F., 310,887, Cl. D26-68.000.
Hillebrand, Thomas W., to Kohler Co. Non-slip surface unit for bathtubs or the like. 310,763, 9-25-90, Cl. D6-583.000.
Himuro, Yasuo; and Tateo, Yuji, to Bridgestone Corporation. Automobile tire. 310,802, 9-25-90, Cl. D12-147.000.
Hino, Ichiro: *See—*
Gioscia, Richard; and Hino, Ichiro, 310,832, Cl. D14-131.000.
Ho, Elizabeth, to Windmere Corporation. Electric lint remover. 310,890, 9-25-90, Cl. D28-50.000.
Hokanson, Jack E. Standup dental appliance. 310,875, 9-25-90, Cl. D24-10.000.
Holmens Bruk Aktiebolag: *See—*
Breger, Carl-Arne, 310,758, Cl. D6-518.000.
Breger, Carl-Arne, 310,759, Cl. D6-523.000.
Honeywell Inc.: *See—*
Wolfe, N. Thomas, 310,788, Cl. D10-53.000.
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., to Globe-Union Inc. Battery container. 310,821, 9-25-90, Cl. D13-104.000.
I.W. Industries: *See—*
Strignano, Joseph, 310,858, Cl. D23-241.000.
Strignano, Joseph, 310,859, Cl. D23-241.000.
Strignano, Joseph, 310,862, Cl. D23-241.000.
Strignano, Joseph, 310,863, Cl. D23-241.000.
Strignano, Joseph, 310,864, Cl. D23-241.000.
Strignano, Joseph, 310,865, Cl. D23-241.000.
Strignano, Joseph, 310,866, Cl. D23-241.000.
Strignano, Joseph, 310,867, Cl. D23-242.000.
Iden, Marlin D., to Brunton Company, The. Combined compass and thermometer. 310,787, 9-25-90, Cl. D10-53.000.
Imanishi Kinzoku Kogyo Kabushiki Kaisha: *See—*
Nishikawa, Hideo, 310,764, Cl. D7-351.000.
Innopak Plastics Corporation: *See—*
Beeman, Everett C., 310,783, Cl. D9-404.000.
Inoue, Ritsuko, to Ricoh Company, Ltd. Camera. 310,841, 9-25-90, Cl. D16-209.000.
International Marine Industries, Inc.: *See—*
Low, Douglas W.; and Pierotti, Elizabeth M., 310,833, Cl. D14-137.000.
International Network Marketing: *See—*
Matlock, John W., 310,879, Cl. D24-36.000.
Iwaki, Osamu, to Kobayashi Hansokiki Co., Ltd. Luggage carrier. 310,895, 9-25-90, Cl. D34-26.000.
Jensen, Donald W., to Sullivan & Mann Lumber Co. Double clamp tree brace. 310,769, 9-25-90, Cl. D8-1.000.
Jervis, John, to Perio Dental, Inc. Dental syringe. 310,876, 9-25-90, Cl. D24-14.000.
Jet-Pumpen HT GmbH: *See—*
Turbanisch, Heinz, 310,838, Cl. D15-8.000.
Johnson, David E. Multi-vial level attachment for hand-held drills. 310,772, 9-25-90, Cl. D8-70.000.
Johnson, Larry; and McCommon, Leonard. Engine heating unit. 310,817, 9-25-90, Cl. D13-119.000.
Justiniano, Joseph G.: *See—*
Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Kabushiki Kaisha Toshiba: *See—*
Tsuboi, Hideki, 310,836, Cl. D14-165.000.
Kelley, Donald W.; and Snell, Arthur L. Fence post clip. 310,780, 9-25-90, Cl. D8-382.000.
Ken Ross, Inc.: *See—*
Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased, 310,777, Cl. D9-378.000.
King, Dale R.: *See—*
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
Kirby, Kevin A. Support stand for use in X-raying a human foot. 310,755, 9-25-90, Cl. D6-349.000.
Kobayashi Hansokiki Co., Ltd.: *See—*
Iwaki, Osamu, 310,895, Cl. D34-26.000.
Kohler Co.: *See—*
Hillebrand, Thomas W., 310,763, Cl. D6-583.000.
Zmuda, Mark A.; and Reid, Mary J., 310,870, Cl. D23-300.000.
Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, to Sharp Corporation. Sorter for copying machine. 310,843, 9-25-90, Cl. D18-42.000.
Kosecoff, Irving W. Bicycle rack. 310,808, 9-25-90, Cl. D12-158.000.
Koya, Kiyofumi: *See—*
Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
Kulak, Joseph. Horseshoe for a hind hoof. 310,898, 9-25-90, Cl. D30-147.000.
Kulak, Joseph. Horseshoe for a front hoof. 310,899, 9-25-90, Cl. D30-148.000.
Kulak, Joseph. Horseshoe for a front hoof. 310,900, 9-25-90, Cl. D30-147.000.
Kumatani, Hiroshi: *See—*
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
Kupperman, Dennis, to RB Toy Development. Simulative glider. 310,853, 9-25-90, Cl. D21-89.000.
Lappin, Rick: *See—*
Pauer, Jericho P.; Proaschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
Pauer, Jericho P.; Proaschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
Larkin, Mark E.; and Bergen, Robert G. Spike transfer housing for use in peritoneal dialysis or the like. 310,881, 9-25-90, Cl. D24-51.000.

LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., to Fairchild Space and Defense Corporation. Data display work station. 310,827, 9-25-90, Cl. D14-106.000.
Lay, Dieter F., to Seaquist Closures, a division of Pittway Corporation. Container closure. 310,786, 9-25-90, Cl. D9-435.000.
Layton, David E., to EGA Limited. Electrical trunking, utility box. 310,824, 9-25-90, Cl. D13-152.000.
Lee, Scott H.: *See*—
Stillwagon, James R.; and Lee, Scott H., 310,753, Cl. D3-61.000.
Levine, Susan H., to Pottery by Levine, Inc. Bowl. 310,768, 9-25-90, Cl. D7-543.000.
Leviton Manufacturing Co., Inc.: *See*—
Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
Lewis, Leslie B. Portable vehicle sun visor. 310,810, 9-25-90, Cl. D12-191.000.
Liu, Su-Liang. Fan heater. 310,871, 9-25-90, Cl. D23-335.000.
Long, Jerry M.; and Palmer, Peter J., to Creative Point, Inc. Compact disc file. 310,752, 9-25-90, Cl. D3-35.000.
Low, Douglas W.; and Pierotti, Elizabeth M., to International Marine Industries, Inc. Marine radio. 310,833, 9-25-90, Cl. D14-137.000.
Lynch, Richard L. Bicycle mountable golf club rack. 310,807, 9-25-90, Cl. D12-158.000.
Magnusson, Lennart: *See*—
Stake, Esbrorn; and Magnusson, Lennart, 310,798, Cl. D12-97.000.
Majewski, Chester A. Diaper cover. 310,880, 9-25-90, Cl. D24-50.000.
Makihara, Ritsuko: *See*—
Kosako, Mikio; Makihara, Ritsuko; and Tatsuta, Yoichi, 310,843, Cl. D18-42.000.
Matlock, John W., to International Network Marketing. Foot massager. 310,879, 9-25-90, Cl. D24-36.000.
Maxwell, Paul B.; and Egan, William E., to Goodyear Tire & Rubber Company, The. Tire. 310,801, 9-25-90, Cl. D12-146.000.
Maxwell, Paul B.: *See*—
Covert, Darrell E.; Hammond, Philip S.; and Maxwell, Paul B., 310,804, Cl. D12-147.000.
McCommon, Leonard: *See*—
Johnson, Larry; and McCommon, Leonard, 310,817, Cl. D13-119.000.
McMurtrey, David K.: *See*—
Pawsat, Dennis P.; and McMurtrey, David K., 310,809, Cl. D12-158.000.
Mecania HB: *See*—
Stake, Esbrorn; and Magnusson, Lennart, 310,798, Cl. D12-97.000.
Melchiorre, Vincent J.: *See*—
LaRochelle, Donald Z.; Cooper, Brian G.; and Melchiorre, Vincent J., 310,827, Cl. D14-106.000.
Mellyn, Lawrence: *See*—
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., to Rubbermaid Incorporated. Hanging file. 310,761, 9-25-90, Cl. D6-567.000.
Minuti, Furio, to Fratelli Guzzini S.p.A. Holder for napkins. 310,767, 9-25-90, Cl. D7-631.000.
Mita Industrial Co., Ltd.: *See*—
Ohata, Yousuke, 310,844, Cl. D18-43.000.
Ohata, Yousuke, 310,845, Cl. D18-43.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
Suyama, Tsutomu; Wakamatsu, Masaharu; Saito, Koji; and Koya, Kiyofumi, 310,829, Cl. D14-113.000.
Mitsubishi Pencil Co., Ltd.: *See*—
Sakurai, Hiroyuki, 310,846, Cl. D19-69.000.
Mrotek, Edward N.: *See*—
Hulsebus, Randy K.; Mrotek, Edward N.; and Brown, Douglas C., 310,821, Cl. D13-104.000.
Murphy, Kent W., to Rubbermaid Incorporated. Storage caddy for household bags. 310,760, 9-25-90, Cl. D6-515.000.
Murphy, Kent W.: *See*—
Mervar, Bob; Murphy, Kent W.; and Craft, Charles W., Jr., 310,761, Cl. D6-567.000.
Murphy, Mark: *See*—
Hertzberg, William E.; Botich, Michael J.; and Murphy, Mark, 310,806, Cl. D12-156.000.
Nabisco Brands, Inc.: *See*—
Constance, Patricia, 310,750, Cl. D1-128.000.
Nakamura, Takashi: *See*—
Sawato, Tatsuya; Nakamura, Takashi; and Kumatani, Hiroshi, 310,816, Cl. D13-112.000.
Napco Security Systems, Inc.: *See*—
Farrell, Richard; and Soloway, Richard, 310,791, Cl. D10-106.000.
NCR Corporation: *See*—
Crease, Pierre L.; and Stephan, Werner B., 310,825, Cl. D14-100.000.
Neiger, Benjamin: *See*—
Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.
Nishikawa, Hideo, to Imanishi Kinzoku Kogyo Kabushiki Kaisha. Microwave oven. 310,764, 9-25-90, Cl. D7-351.000.
North, David R.; and Stewart, Charles H., to General Motors Corporation. Wheel cover. 310,811, 9-25-90, Cl. D12-206.000.
Nottingham, John R.: *See*—
Slayton, Nancy D.; Nottingham, John R.; and Spirk, John W., 310,854, Cl. D21-105.000.
Nuttal, Michael J.: *See*—
Grundstrom, Douglas R.; Boyle, Dennis J.; Au, Nelson S.; Nuttal, Michael J.; and Herron, Matthew A., 310,828, Cl. D14-106.000.
Ohata, Yousuke, to Mita Industrial Co., Ltd. Toner cartridge. 310,844, 9-25-90, Cl. D18-43.000.
Ohata, Yousuke, to Mita Industrial Co., Ltd. Toner cartridge. 310,845, 9-25-90, Cl. D18-43.000.
Oki Electric Industry Co., Ltd.: *See*—
Suda, Masami, 310,826, Cl. D14-105.000.
Paciullo, Francis P.; and Rivera, Ligia A., to Colgate-Palmolive Company. Flexible cover for a sponge mop. 310,901, 9-25-90, Cl. D32-40.000.
Paciullo, Francis P.; and Rivera, Ligia A., to Colgate-Palmolive Company. Flexible cover for a sponge mop. 310,902, 9-25-90, Cl. D32-40.000.
Palmer, Peter J.: *See*—
Long, Jerry M.; and Palmer, Peter J., 310,752, Cl. D3-35.000.
Paris, Emilio F., to Hijo De E.F. Escofet S.A. Exterior lighting fixture. 310,887, 9-25-90, Cl. D26-68.000.
Parker Manufacturing Company: *See*—
Ewig, John F., 310,771, Cl. D8-69.000.
Pattco, Inc.: *See*—
Dinges, George N., 310,904, Cl. D34-12.000.
Patton, Russell S.; King, Dale R.; and Heald, Edward E., to R. D. Werner Co., Inc. Cover for tops of ladders. 310,884, 9-25-90, Cl. D25-68.000.
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, to Ashley Furniture Industries, Inc. Door chest. 310,756, 9-25-90, Cl. D6-445.000.
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, to Ashley Furniture Industries, Inc. Door Chest. 310,757, 9-25-90, Cl. D6-446.000.
Pawsat, Dennis P.; and McMurtrey, David K., to Wald Manufacturing Co., Inc. Bicycle carrier rack. 310,809, 9-25-90, Cl. D12-158.000.
Pedersen, Carol M. Anatomical doll for child abuse investigations. 310,856, 9-25-90, Cl. D21-166.000.
Perbix, Richard D. Combined set of containers and wall mounted hanging unit therefor. 310,848, 9-25-90, Cl. D20-18.000.
Perio Dental, Inc.: *See*—
Jervis, John, 310,876, Cl. D24-14.000.
Perry, Robert. Anti-theft anchor. 310,830, 9-25-90, Cl. D14-114.000.
Pierotti, Elizabeth M.: *See*—
Low, Douglas W.; and Pierotti, Elizabeth M., 310,833, Cl. D14-137.000.
Pope, John A. Orthopedic unit or the like for relief of back ailment. 310,882, 9-25-90, Cl. D24-64.000.
Pottery by Levine, Inc.: *See*—
Levine, Susan H., 310,768, Cl. D7-543.000.
Premium Plastics, Inc.: *See*—
Anderson, Robert S., 310,903, Cl. D34-9.000.
Pronschinske, Jane: *See*—
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,756, Cl. D6-445.000.
Pauer, Jericho P.; Pronschinske, Jane; and Lappin, Rick, 310,757, Cl. D6-446.000.
Quaker Oats Company, The: *See*—
Snell-Kelly, Janet E., 310,855, Cl. D21-110.000.
R. D. Werner Co., Inc.: *See*—
Patton, Russell S.; King, Dale R.; and Heald, Edward E., 310,884, Cl. D25-68.000.
Radtke, Lee F.: *See*—
Shaffer, James R.; and Radtke, Lee F., 310,789, Cl. D10-75.000.
RB Toy Development: *See*—
Kupperman, Dennis, 310,853, Cl. D21-89.000.
Reeves, Kevin E.; and Young, Harold G., to TRC Acquistion Corporation. Hydro-massage appliance. 310,877, 9-25-90, Cl. D24-38.000.
Reid, Mary J.: *See*—
Zmuda, Mark A.; and Reid, Mary J., 310,870, Cl. D23-300.000.
Reilly, Vincent D. Gauge indicator. 310,790, 9-25-90, Cl. D10-103.000.
Representative, Mary M. Ross Legal: *See*—
Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased, 310,777, Cl. D9-378.000.
Ricoh Company, Ltd.: *See*—
Inoue, Ritsuko, 310,841, Cl. D16-209.000.
Rivera, Lester: *See*—
Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, 310,814, Cl. D13-158.000.
Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.

Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.

Rivera, Ligia A.: *See*—
Paciullo, Francis P.; and Rivera, Ligia A., 310,901, Cl. D32-40.000.
Paciullo, Francis P.; and Rivera, Ligia A., 310,902, Cl. D32-40.000.

Robinson, Trevor A. Doll. 310,857, 9-25-90, Cl. D21-168.000.

Rogers, Edward J.: *See*—
Chabala, Leonard V.; and Rogers, Edward J., 310,823, Cl. D13-175.000.

Rosenbaum, Saul; Watson, Douglas; Justiniano, Joseph G.; and Rivera, Lester, to Leviton Manufacturing Co., Inc. Combined sound activated switch and cover plate. 310,814, 9-25-90, Cl. D13-158.000.

Rosenbaum, Saul: *See*—
Watson, Douglas; Rosenbaum, Saul; Justiniano, Joseph G.; and Rivera, Lester, 310,815, Cl. D13-158.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,819, Cl. D13-125.000.
Watson, Douglas; Rivera, Lester; Justiniano, Joseph G.; Rosenbaum, Saul; Mellyn, Lawrence; and Blumberg, Thomas A., 310,820, Cl. D13-125.000.
Zaretsky, Albert; Rosenbaum, Saul; Rivera, Lester; and Neiger, Benjamin, 310,818, Cl. D13-125.000.

Ross, Daniel S.; Weintraub, Alan M.; and Ross, Joseph K., deceased (by Representative, Mary M. Ross Legal), to Ken Ross, Inc. Liquid container. 310,777, 9-25-90, Cl. D9-378.000.

Ross, Joseph K., deceased: *See*—
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61.45 M 4,959,513
146 R 4,959,514
181 4,959,515

CLASS 201

2 4,959,126

CLASS 202

177 4,959,127

CLASS 203

57 4,959,128

CLASS 204

28 4,959,129
32.1 4,959,130
59 R 4,959,131
101 4,959,132
129 4,959,135
182.8 4,959,133
4,959,134
192.15 4,959,136
299 EC 4,959,137
414 4,959,138

CLASS 206

6.1 4,958,727
44 B 4,958,728
315.1 4,958,729
315.110 4,958,730
333 4,958,731
379 4,958,732
409 4,958,733
435 4,958,734
497 4,958,735
531 4,958,736
557 4,958,737

CLASS 208

39 4,959,139
59 4,959,140

CLASS 210

109 4,959,141
167 4,959,142
232 4,959,144
237 4,959,146
242.3 4,959,143
532.2 4,959,145
635 4,959,148
636 4,959,149
638 4,959,150
640 4,959,151
651 4,959,152
670 4,959,153
680 4,959,154
687 4,959,155
701 4,959,156
712 4,959,147
752 4,959,157
787 4,959,158

CLASS 211

89 4,958,738
153 4,958,739

CLASS 215

6 4,958,740

CLASS 219

10.55 E 4,959,517
10.55 F 4,959,516
99 4,959,518
110 4,959,519
121.48 4,959,520
121.63 4,959,521
121.75 4,959,522
124.34 4,959,523
275 4,959,524
291 4,959,525
314 4,959,526
365 4,959,527
388 4,959,529
432 4,959,528

CLASS 220

83 4,958,741
209 4,958,742
288 4,958,743
305 4,958,744
375 4,958,745

CLASS 221

24 4,958,746

CLASS 222

67 4,958,747
131 4,958,748
133 4,958,749
135 4,958,750
164 4,958,756
192 4,958,751
321 4,958,752
383 4,958,754
394 4,958,757
402.23 4,958,755

CLASS 224

151 4,958,759
153 4,958,760
267 4,958,758
316 4,958,761

CLASS 228

1.1 4,958,762
193 4,958,763
248 4,958,764

CLASS 235

383 4,959,530

CLASS 236

20 R 4,958,765

CLASS 237

12.3 B 4,958,766

CLASS 239

13 4,958,767
34 4,958,768
114 4,958,769
145 4,958,770
453 4,958,771
526 4,959,159
542 4,958,772
584 4,958,773
4,958,774

CLASS 241

88.1 4,958,775
171 4,958,776

CLASS 242

7.11 4,958,777
25 A 4,958,778
47 4,958,780
71.7 4,958,781
75.43 4,958,782
035.6 R 4,958,779
129.6 4,958,784
157 R 4,958,783
295 4,958,785

CLASS 244

17.13 4,958,786
153 R 4,958,787
169 4,958,788

CLASS 248

56 4,958,789
4,958,790
74.1 4,958,791
74.2 4,958,792
122 4,958,793
183 4,958,794
317 4,958,795
4,958,796
345.1 4,958,797
346.1 4,958,798
430 4,958,799

CLASS 249

219.1 4,958,800

CLASS 250

201.9 4,959,531
4,959,532
208.1 4,959,533
213 A 4,959,534
214 R 4,959,535
216 4,959,536
223 B 4,959,537
4,959,538
227.12 4,959,540
227.19 4,959,539
237 G 4,959,542
237 R 4,959,541
291 4,959,543
305 4,959,544
327.2 4,959,545
330 4,959,546
336.1 4,959,547
390.09 4,959,548
461.1 4,959,549
492.3 4,959,550
504 R 4,959,551
560 4,959,552
4,959,553

CLASS 251

11 4,958,801
129.02 B1 4,848,725
310 4,958,802
342 4,958,803

CLASS 252

8.51 4,959,164
8.551 4,959,163
4,959,165
32.7 E 4,959,167
48.6 4,959,168
68 4,959,169
135 4,959,170
4,959,179
174 4,959,171
299.1 4,959,172
299.65 4,959,173
301.6 R 4,959,174
327 E 4,959,166
340 4,959,160
364 4,959,175
389.53 4,959,176
391 4,959,177
396 4,959,161
514 4,959,178
519 4,959,162
4,959,180
625 4,959,181
700 4,959,182

CLASS 254

120 4,958,804
332 4,958,805

CLASS 256

12.5 4,958,806
65 4,958,807

CLASS 260

402 4,959,187

CLASS 261

87 4,959,183

CLASS 264

40.3 4,959,184
81 4,959,185
102 4,959,186
255 4,959,188
510 4,959,189
516 4,959,190
529 4,959,191

CLASS 266

154 4,958,808
229 4,958,809

CLASS 267

140.1 4,958,810
4,958,811
294 4,958,812

CLASS 269

32 4,958,813
43 4,958,814
58 4,958,815
136 4,958,818
323 4,958,817
328 4,958,816

CLASS 270

31 4,958,819
92 4,958,820

CLASS 271

3.1 4,958,821
9 4,958,822
4,958,823
11 4,958,824
119 4,958,825
124 4,958,826
176 4,958,827
186 4,958,828
273 4,958,829

CLASS 272

69 4,958,830
73 4,958,831
4,958,832
123 4,958,833

CLASS 273

77 A 4,958,834
85 G 4,958,835
184 R 4,958,836
237 4,958,837
423 4,958,838

CLASS 279

2 R 4,958,839
62 4,958,840

CLASS 280

7.1 4,958,842
30 4,958,843
47.35 4,958,841
185 4,958,844
407.1 4,958,845
502 4,958,847
509 4,958,848
624 Re.33,350
652 4,958,846
668 4,958,849
696 4,958,863
714 4,958,850
735 4,958,851
775 4,958,852
801 4,958,853
806 4,958,854

CLASS 281

45 4,958,855

CLASS 288

14 4,958,856
21 4,958,857
24 4,958,858
39 4,958,859
49 4,958,860
175 4,958,861
334 4,958,862

CLASS 292

19 4,958,864
111 4,958,865
245 4,958,866
259 R 4,958,867
291 4,958,868
339 4,958,869

CLASS 293

106 4,958,870

CLASS 294

1.4 4,958,871
75 4,958,872
93 4,958,873

CLASS 296

26 4,958,874
32 4,958,875
39.2 4,958,876
65.1 4,958,877
97.5 4,958,878
97.6 4,958,879
97.7 4,958,880
98 4,958,881
108 4,958,882
152 4,958,883
188 4,958,884

CLASS 297

55 4,958,885
229 4,958,886
250 4,958,887

CLASS 307

38 4,959,554
219 4,959,555
261 4,959,556
265 4,959,557
354 4,959,558
425 4,959,559
443 4,959,560
4,959,561
4,959,562
448 4,959,563
465 4,959,564
542 4,959,565

CLASS 310

11 4,959,566
26 4,959,567
51 4,959,568
53 4,959,569
54 4,959,570
67 R 4,959,571
68 D 4,959,572
68 R 4,959,573
91 4,959,574
213 4,959,575
239 4,959,576
263 4,959,577
268 4,959,578
323 4,959,579
4,959,580
328 4,959,581

CLASS 312

140.3 4,958,888
208 4,958,889
214 4,958,890
287 4,958,891
307 4,959,582

CLASS 313

000 4,959,584
113 4,959,583
271 4,959,585
273 4,959,586
623 4,959,587
625 4,959,588

CLASS 315

58 4,959,589
169.3 4,959,590
209 R 4,959,591
248 4,959,592
290 4,959,593
397 4,959,594

CLASS 318

138 4,959,595
254 4,959,596
568.15 4,959,597
599 4,959,598
603 4,959,599
625 4,959,600
696 4,959,601
803 4,959,602

CLASS 320

1 4,959,603
20 4,959,604

CLASS 322

10 4,959,605

CLASS 323

286 4,959,606

CLASS 324

103 R 4,959,607
132 4,959,608
158 F 4,959,609
309 4,959,610
4,959,611
311 4,959,612
318 4,959,613
418 4,959,784
636 4,959,614
690 4,959,615

CLASS 328

14 4,959,616
133 4,959,617
155 4,959,618

CLASS 329

306 4,959,619
327 4,959,620

CLASS 330

253 4,959,621
257 4,959,622
265 4,959,623

CLASS 331

116 R 4,959,624

CLASS 332

135 4,959,625

CLASS 333

182 4,959,626

CLASS 338

106 4,959,627
205 4,959,628
228 4,959,629

CLASS 336

83 4,959,630
4,959,631

CLASS 338

22 R 4,959,632
4,959,633

CLASS 340

467 4,959,634
568 4,959,635
4,959,636
573 4,959,637
577 4,959,638
618 4,959,639
693 4,959,640
700 4,959,641
716 4,959,642
721 4,959,643
825.44 4,959,644
4,959,648
825.72 4,959,645
825.720 4,959,647
825.83 4,959,646
870.420 4,959,649

CLASS 341

72 Re.33,356
126 4,959,650
131 4,959,651

CLASS 342

17 4,959,653
120 4,959,654
389 4,959,655
418 4,959,656

CLASS 343

725 4,959,657
786 4,959,658

CLASS 346

1.1 4,959,659
4,959,660
4,959,661
4,959,662
76 PH 4,959,663
108 4,959,664
4,959,665
136 4,959,666
140 R 4,959,667
4,959,673
4,959,674
155 4,959,668
157 4,959,669

CLASS 350

3.6 4,958,892
6.6 4,958,893
4,958,894
96.12 4,958,895
96.13 4,958,896
96.14 4,958,898
96.15 4,958,897
96.18 4,958,900
4,958,902
96.20 4,958,899
4,958,903
4,958,904
96.21 4,958,905
243 4,958,907
252 4,958,913
311 4,958,908
320 4,958,909
321 4,958,910
331 R 4,958,911
333 4,958,912
342 4,958,914
345 4,958,915
350 S 4,958,916
354 4,958,921
357 4,958,917
378 4,958,918
418 4,958,919
530 4,958,920

CLASS 351

46 4,958,922
52 4,958,923
57 4,958,924
210 4,958,925

CLASS 354

76 4,959,670
81 4,959,671
173.1 4,959,672
400 4,959,675
4,959,676
402 4,959,677
403 4,959,678
419 4,959,679
435 4,959,680

CLASS 355

27 4,959,681
4,959,682
28 4,959,683
55 4,959,684
72 4,959,685
214 4,959,687
219 4,959,688
233 4,959,689
245 4,959,690
246 4,959,691
253 4,959,692
290 4,959,693
327 4,959,695

CLASS 356

73.1 4,958,926
140 4,958,927
328 4,958,928
345 4,958,929
357 4,958,930
360 4,958,931
383 4,958,932

CLASS 357

16 4,959,694
4,959,696
22 4,959,697
23.6 4,959,698
4,959,709
23.7 4,959,699
4,959,700
24 4,959,701
34 4,959,702
38 4,959,703
41 4,959,704

51 4,959,705
68 4,959,706
76 4,959,707
84 4,959,708

CLASS 358

80 4,959,711
4,959,712
98 4,959,710
106 Re.33,357
108 4,959,713
125 4,959,714
139 4,959,716
140 4,959,715
147 4,959,717
148 4,959,718
183 4,959,719
191.1 4,959,720
194.1 4,959,721
211 4,959,722
213.11 4,959,723
213.29 4,959,724
222 4,959,725
227 4,959,726
228 4,959,727
4,959,728
229 4,959,729
298 4,959,730
300 4,959,731
336 4,959,732
338 4,959,733
341 4,959,734
342 4,959,735
471 4,959,736
475 4,959,737

CLASS 360

78.13 4,959,738
95 4,959,739
106 4,959,740
122 4,959,741
130.23 4,959,742
130.24 4,959,743
133 4,959,744

CLASS 361

13 4,959,746
31 4,959,747
310 4,959,652
311 4,959,745
323 4,959,748
396 4,959,749
401 4,959,750
406 4,959,751
424 4,959,752
525 4,959,753
527 4,959,754

CLASS 362

4 4,959,755
34 4,959,756
61 4,959,757
66 4,959,758
80 4,959,759
105 4,959,760
226 4,959,761
376 4,959,762
382 4,959,763

CLASS 363

16 4,959,764
20 4,959,765
48 4,959,766

CLASS 364

151 4,959,767
187 4,959,768
200 4,959,769
4,959,770
4,959,771
4,959,772
4,959,773
4,959,774
4,959,775
4,959,776
4,959,777
4,959,778
4,959,779
4,959,780
4,959,781
4,959,782
401 4,959,686
408 4,959,788
412 4,959,783
419 4,959,785
424.05 4,959,787
424.1 4,959,786
426.03 4,959,794
431.05 4,959,789
464.03 4,959,795
497 4,959,796
508 4,959,797
513 4,959,798
4,959,799
516 4,959,800
518 4,959,790
4,959,801

519 4,959,791
521 4,959,802
4,959,803
557 4,959,804
562 4,959,805
565 4,959,806
4,959,807
566 4,959,808
579 4,959,792
581 4,959,809
900 4,959,793
4,959,810

CLASS 365

49 4,959,811
185 4,959,812
189.12 4,959,813
207 4,959,814
230.06 4,959,815
233.5 4,959,816

CLASS 366

81 4,958,933
145 4,958,934
154 4,958,935

CLASS 367

97 4,959,817
189 4,959,818

CLASS 368

93 4,959,819

CLASS 369

13 4,959,820
4,959,821
44.11 4,959,822
44.13 4,959,823
44.14 4,959,824
48 4,959,825

CLASS 370

1 4,959,826
3 4,959,827
4 4,959,828
85.3 4,959,829
108 4,959,830
112 4,959,831

CLASS 371

27 4,959,832
32 4,959,833
47.1 4,959,834
51.1 4,959,835
69.1 4,959,836

CLASS 372

6 4,959,837
25 4,959,838
46 4,959,839
57 4,959,840

CLASS 373

10 4,959,841

CLASS 374

1 4,958,936
16 4,958,937
208 4,958,938

CLASS 375

39 4,959,842
59 4,959,843
97 4,959,844
106 4,959,845
118 4,959,846
121 4,959,847

CLASS 376

260 4,959,192
299 4,959,193

CLASS 378

46 4,959,848

CLASS 379

32 4,959,849
58 4,959,850
59 4,959,851
70 4,959,852
157 4,959,854
180 4,959,853
213 4,959,855
245 4,959,856
390 4,959,857
445 4,959,858

CLASS 380

4 4,959,860
4,959,861
10 4,959,862
38 4,959,863

CLASS 381

10 4,959,859
43 4,959,864
46 4,959,865
51 4,959,866

107 4,959,867

CLASS 382

35 4,958,939
41 4,959,868
51 4,959,869
56 4,959,870
59 4,959,871

CLASS 384

398 4,958,940
474 4,958,941
486 4,958,942
488 4,958,943
512 4,958,944
4,958,945
4,958,946
523 4,958,947
609 4,958,947

CLASS 388

812 4,958,948

CLASS 400

314 4,958,949
629 4,958,950

CLASS 401

1 4,958,951
131 4,958,952

CLASS 403

297 4,958,953

CLASS 404

10 4,958,954
40 4,958,964
75 4,958,955

CLASS 405

23 4,958,956
55 4,958,957
154 4,958,958
184 4,958,959
195 4,958,960
260 4,958,961
267 4,958,962

CLASS 408

56 4,958,963
226 4,958,965
239 A 4,958,966

CLASS 409

185 4,958,967
232 4,958,968
234 4,958,969

CLASS 411

12 4,958,970
38 4,958,971
387 4,958,972
423 4,958,973

CLASS 412

37 4,958,974

CLASS 414

259 4,958,975
331 4,958,976
339 4,958,977
483 4,958,978
549 4,958,979
563 4,958,980
694 4,958,981
751 4,958,982
795.3 4,958,983

CLASS 415

55.1 4,958,984
101 4,958,985
188 4,958,986

CLASS 416

213 A 4,958,987

CLASS 417

53 4,958,988
222 4,958,989
410 4,958,990

CLASS 418

29 4,958,992
55.3 4,958,993
55.6 4,958,991
132 4,958,994
152 4,958,995
4,958,996
171 4,958,997

CLASS 419

46 4,959,194
67 4,959,195

CLASS 422

68.05 4,959,196
101 4,959,197
220 4,959,198
300 4,959,199

CLASS 423

347 4,959,200
445 4,958,998
446 4,959,201
502 4,959,202
602 4,959,203

CLASS 424

54 4,959,204
59 4,959,205
70 4,959,206
76.1 4,959,207
78 4,959,208
81 4,959,209
85.7 4,959,210
93 4,959,211
94.1 4,959,212
195.1 4,959,214
422 4,959,215
430 4,959,216
473 4,959,217
4,959,218
480 4,959,219
490 4,959,220
659 4,959,221
692 4,959,222

CLASS 425

110 4,958,999
116 4,959,000
147 4,959,001
192 R 4,959,002
346 4,959,003
397 4,959,004
533 4,959,006
577 4,959,005
4,959,007

CLASS 426

2 4,959,223
3 4,959,225
4,959,226
11 4,959,228
35 4,959,227
39 4,959,229
102 4,959,230
111 4,959,231
271 4,959,232
281 4,959,235
288 4,959,236
330.5 4,959,237
443 4,959,233
447 4,959,238
580 4,959,234
603 4,959,239
637 4,959,240

CLASS 427

11 4,959,241
38 4,959,242
48 4,959,243
53.1 4,959,244
4,959,245
97 4,959,246
126.5 4,959,247
385.5 4,959,248
387 4,959,249

CLASS 428

15 4,959,250
40 Re.33,353
4,959,008
41 4,959,251
64 4,959,252
102 4,959,253
131 4,959,254
143 4,959,255
144 4,959,256
156 4,959,257
192 4,959,258
215 4,959,259
255 4,959,260
312.2 4,959,261
329 4,959,262
4,959,263
331 4,959,264
343 4,959,265
375 Re.33,354
383 4,959,266
390 4,959,267
403 4,959,268
421 4,959,269
426 4,959,270
476.3 4,959,271
537.7 4,959,272
548 4,959,273
555 4,959,274
603 4,959,275
614 4,959,276
623 4,959,277
642 4,959,278
660 4,959,279

CLASS 429

27 4,959,280
194 4,959,281

224 4,959,282

CLASS 430

1 4,959,283
2 4,959,284
11 4,959,285
45 4,959,286
59 4,959,287
4,959,288
64 4,959,289
73 4,959,290
138 4,959,291
165 4,959,292
189 4,959,293
204 4,959,294
281 4,959,295
302 4,959,296
322 4,959,297
496 4,959,298
544 4,959,299
546 4,959,300

CLASS 431

1 4,959,009
12 4,959,010
263 4,959,011

CLASS 432

76 4,959,012

CLASS 433

35 4,959,013
72 4,959,014

CLASS 434

2 4,959,015
22 4,959,016
110 4,959,017

CLASS 435

5 4,959,301
4,959,302
6 4,959,309
7 4,959,303
4,959,304
4,959,305
4,959,306
4,959,307
4,959,308
4,959,310
68.1 4,959,311
69.1 4,959,313
4,959,314
4,959,318
91 4,959,312
167 4,959,315
172.3 4,959,316
4,959,317
4,959,327
240.2 4,959,319
240.27 4,959,320
284 4,959,321
311 4,959,322
320 4,959,323

CLASS 436

169 4,959,324

CLASS 437

30 4,959,325
40 4,959,326
86 4,959,328
187 4,959,329

CLASS 439

67 4,959,030
76 4,959,018
4,959,019
138 4,959,020
310 4,959,021
589 4,959,022
595 4,959,023
607 4,959,024
622 4,959,025
651 4,959,026
655 4,959,027
733 4,959,028
759 4,959,031
862 4,959,029

CLASS 440

66 4,959,032
76 4,959,033

CLASS 441

41 4,959,034

CLASS 446

40 4,959,035
299 4,959,037
385 4,959,036

CLASS 455

164 4,959,872
303 4,959,873
601 4,959,874

CLASS 460

149 4,959,038

CLASS 464

66 4,959,039

CLASS 474

103 4,959,040
111 4,959,041
134 4,959,042

CLASS 478

230 4,959,043

CLASS 493

194 4,959,044
254 4,959,045
382 4,959,046

CLASS 501

8 4,959,330
89 4,959,331
4,959,332
136 4,959,333

CLASS 502

43 4,959,334
62 4,959,335
107 4,959,336
230 4,959,337
263 4,959,338
302 4,959,339
401 4,959,340
404 4,959,341
439 4,959,342

CLASS 503

200 4,959,343

CLASS 505

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2 4,959,350
4 4,959,351
9 4,959,352
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21 4,959,213
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23 4,959,355
64 4,959,356
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171 4,959,358
211 4,959,359
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220 4,959,361
231.5 4,959,362
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237.5 4,959,364
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264 4,959,369
280 4,959,370
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338 4,959,376
349 4,959,377
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494 4,959,389
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555 4,959,394
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169	4,959,403
267	4,959,404
321	4,959,405
413	4,959,406
425	4,959,407
434	Re.33,355
469	4,959,387
523	4,959,408

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11	4,959,414
61	4,959,409
67	4,959,410
	4,959,411
98	4,959,412
100	4,959,413
133	4,959,415
222	4,959,416
274	4,959,417
282	4,959,418
301	4,959,419
331.7	4,959,420
437	4,959,421
463	4,959,422
471	4,959,423
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527	4,959,426

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142	4,959,427
201	4,959,428
230.5	4,959,429
257	4,959,430
261	4,959,431
287	4,959,432
314	4,959,433
342	4,959,434
347.2	4,959,435
348	4,959,436

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26	4,959,437
98	4,959,438
111	4,959,439
125	4,959,440
168	4,959,442
170	4,959,443
	4,959,444
181	4,959,445
185	4,959,446
188	4,959,447
192	4,959,448
271	4,959,449
272	4,959,450
328	4,959,451
	4,959,452
336	4,959,453
352	4,959,454
371	4,959,456

CLASS 530

351	4,959,455
387	4,959,457
	4,959,458

CLASS 536

1.1	4,959,459
6.4	4,959,460
18.7	4,959,461
27	4,959,462
	4,959,463
114	4,959,464
115	4,959,465
119	4,959,466
124	4,959,467
127	4,959,468

CLASS 540

222	4,959,469
363	4,959,470

CLASS 544

71	4,959,471
258	4,959,472
263	4,959,473
279	4,959,474
324	4,959,475

CLASS 546

167	4,959,476
307	4,959,477
319	4,959,478

CLASS 548

255	4,959,479
262.4	4,959,480
462	4,959,481
543	4,959,482

CLASS 549

315	4,959,483
334	4,959,484
461	4,959,485
532	4,959,486

CLASS 558

161	4,959,441
343	4,959,487

CLASS 560

76	4,959,488
170	4,959,489

CLASS 562

74	4,959,490
94	4,959,491
006	4,959,497
453	4,959,492
506	4,959,493
515	4,959,494
560	4,959,495
583	4,959,496
891	4,959,458

CLASS 564

59	4,959,499
82	4,959,500
89	4,959,501
127	4,959,502
265	4,959,503

CLASS 600

19	4,959,047

CLASS 604

9	4,959,048
22	4,959,049
44	4,958,901
49	4,959,050
77	4,959,051
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127	4,959,053
175	4,959,054
179	4,959,055
186	4,959,056
264	4,959,057
280	4,959,058
358	4,959,059
368	4,959,060
	4,959,061
387	Re.33,351
403	4,959,062

CLASS 606

15	4,959,063
65	Re.33,348
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69	4,959,065
89	4,959,066
190	4,959,067
194	4,958,634
	B1 4,261,339
222	4,959,068
228	4,959,069

CLASS 623

6	4,959,070
20	4,959,071
22	4,959,072
55	4,959,073
66	4,959,074

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D1—	128	310,750
D2—	514	310,751
D3—	35	310,752
	61	310,753
D4—	138	310,754
D6—	349	310,755
	445	310,756
	446	310,757
	515	310,760
	518	310,758
	523	310,759
	567	310,761
	569	310,762
	583	310,763
D7—	351	310,764
	362	310,765
	543	310,768
	564	310,766
	631	310,767
D8—	1	310,769
	29	310,770
	69	310,771
	70	310,772
	89	310,773
	358	310,776
	377	310,775
	382	310,780
D9—	305	310,774
	367	310,778
	377	310,779
	378	310,777
	398	310,781
	404	310,782
		310,783
	416	310,784
		310,785
	435	310,786
D10—	53	310,787
		310,788
	75	310,789
	103	310,790
	106	310,791
	107	310,792
	114	310,793
D11—	202	310,794
		310,795
	203	310,796
D12—	17	310,797
	97	310,798
	106	310,799
	137	310,800
	146	310,801
	147	310,802
		310,803
		310,804
	151	310,805
	156	310,806
	158	310,807
		310,808
		310,809
	191	310,810
	206	310,811
	214	310,812
D13—	103	310,813
	104	310,821
	112	310,816
	119	310,817
	125	310,818
		310,819
		310,820
	152	310,824
	158	310,814
		310,815
	160	310,822
	175	310,823
D14—	100	310,825
	105	310,826
	106	310,827
		310,828
	113	310,829
	114	310,830
	121	310,831
	131	310,832
	137	310,833
	156	310,834
	163	310,835
	165	310,836
	168	310,837
D15—	8	310,838
D16—	102	310,839
	134	310,840
	209	310,841
D17—	14	310,842
D18—	42	310,843
	43	310,844
		310,845
D19—	69	310,846
	90	310,847
D20—	18	310,848
	22	310,849
D21—	41	310,850
		310,851
	69	310,852
	89	310,853
	105	310,854
	110	310,855
	166	310,856
	168	310,857
D23—	213	310,860
		310,861
	241	310,858
		310,859
		310,862
		310,863
		310,864
		310,865
		310,866
	242	310,867
	265	310,868
	296	310,869
	300	310,870
	335	310,871
	368	310,872
	370	310,873
	376	310,874
D24—	10	310,875
	14	310,876
	36	310,879
	38	310,877
	39	310,878
	50	310,880
	51	310,881
	64	310,882
		310,883
D25—	68	310,884
D26—	65	310,886
	68	310,887
	139	310,885
D27—	158	310,888
D28—	45	310,889
	50	310,890
	59	310,891
		310,892
D29—	12	310,893
D30—	147	310,898
		310,900
	148	310,899
D32—	40	310,901
		310,902
	60	310,897
D34—	9	310,903
	12	310,904
	23	310,894
	26	310,895
	46	310,896

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01 :	4,958,777	4,958,839	4,959,473	4,958,913	4,959,648	4,959,593
	4,958,790	4,958,841	4,959,488	4,959,022	4,959,772	4,959,605
	4,959,734	4,958,855	4,959,490	4,959,127	4,959,783	4,959,707
02 :	4,958,582	4,958,857	4,959,491	4,959,133	4,959,817	4,959,851
04 :	4,958,575	4,958,873	4,959,511	4,959,156	13 : 4,958,412	18 : Re.33,348
	4,958,737	4,958,879	4,959,532	4,959,227	4,958,638	4,958,429
	4,958,843	4,958,881	4,959,539	4,959,309	4,958,734	4,958,472
	4,958,845	4,958,889	4,959,543	4,959,365	4,958,739	4,958,488
	4,958,864	4,958,892	4,959,559	4,959,514	4,958,775	4,958,570
	4,958,899	4,958,908	4,959,565	4,959,600	4,958,797	4,958,625
	4,959,026	4,958,914	4,959,602	4,959,628	4,958,903	4,958,758
	4,959,564	4,958,919	4,959,606	4,959,686	4,959,102	4,958,853
	4,959,594	4,958,962	4,959,614	4,959,782	4,959,251	4,958,890
	4,959,702	4,958,970	4,959,647	4,708,080	4,959,353	4,958,940
	4,959,792	4,958,989	4,959,656	10 : Re.33,352	4,959,790	4,959,064
	4,959,836	4,959,005	4,959,667	4,958,930	16 : 4,959,146	4,959,071
05 :	4,958,383	4,959,013	4,959,674	4,958,987	4,959,158	4,959,512
	4,959,578	4,959,027	4,959,699	4,959,113	4,959,325	4,959,622
06 :	4,958,384	4,959,040	4,959,714	4,959,189	4,959,504	4,959,629
	4,958,416	4,959,048	4,959,717	4,959,237	17 : 4,958,453	4,959,637
	4,958,427	4,959,050	4,959,718	4,959,283	4,958,455	4,959,708
	4,958,454	4,959,058	4,959,725	4,959,284	4,958,557	4,959,720
	4,958,456	4,959,065	4,959,749	4,959,295	4,958,559	4,959,751
	4,958,457	4,959,070	4,959,764	4,959,317	4,958,617	4,959,758
	4,958,470	4,959,079	4,959,774	4,959,330	4,958,619	4,959,759
	4,958,474	4,959,082	4,959,779	4,959,453	4,958,621	4,959,852
	4,958,476	4,959,105	4,959,781	11 : 4,958,465	4,958,736	4,959,859
	4,958,503	4,959,135	4,959,798	4,958,627	4,958,757	4,436,092
	4,958,520	4,959,143	4,959,800	12 : 4,958,431	4,958,792	19 : 4,958,403
	4,958,547	4,959,176	4,959,804	4,958,434	4,958,824	4,958,598
	4,958,586	4,959,178	4,959,810	4,958,461	4,958,831	4,958,729
	4,958,590	4,959,187	4,959,833	4,958,463	4,958,832	20 : 4,958,800
	4,958,593	4,959,193	4,959,840	4,958,467	4,958,837	4,959,528
	4,958,597	4,959,197	4,959,844	4,958,585	4,958,923	21 : 4,958,468
	4,958,618	4,959,199	4,959,846	4,958,596	4,958,997	4,958,620
	4,958,630	4,959,202	4,959,848	4,958,643	4,959,012	4,958,667
	4,958,631	4,959,205	4,959,862	4,958,683	4,959,028	4,958,990
	4,958,634	4,959,217	08 : 4,958,629	4,958,727	4,959,033	4,959,107
	4,958,642	4,959,218	4,958,916	4,958,740	4,959,131	4,959,464
	4,958,644	4,959,236	4,959,229	4,958,924	4,959,140	22 : Re.33,347
	4,958,648	4,959,240	4,959,541	4,958,985	4,959,145	4,958,392
	4,958,652	4,959,303	4,959,705	4,959,155	4,959,147	4,958,691
	4,958,658	4,959,305	4,959,706	4,959,250	4,959,198	4,958,720
	4,958,663	4,959,306	4,959,797	4,959,315	4,959,226	4,958,747
	4,958,684	4,959,307	4,959,823	4,959,508	4,959,234	4,959,014
	4,958,706	4,959,310	4,959,853	4,959,518	4,959,272	4,959,148
	4,958,730	4,959,314	4,959,856	4,959,530	4,959,304	4,959,486
	4,958,741	4,959,324	09 : 4,958,462	4,959,547	4,959,364	4,959,500
	4,958,743	4,959,370	4,958,517	4,959,554	4,959,390	23 : 4,959,313
	4,958,755	4,959,387	4,958,543	4,959,569	4,959,467	24 : 4,958,571
	4,958,793	4,959,401	4,958,569	4,959,617	4,959,468	4,958,595
	4,958,826	4,959,457	4,958,661	4,959,624	4,959,534	4,958,738
	4,958,833	4,959,463	4,958,782	4,959,640	4,959,548	4,958,829

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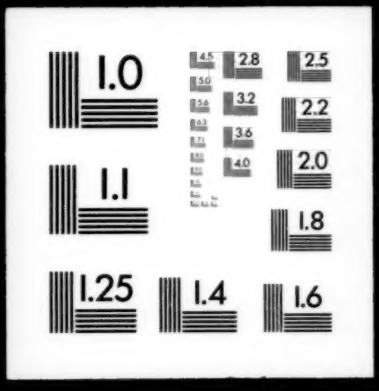
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